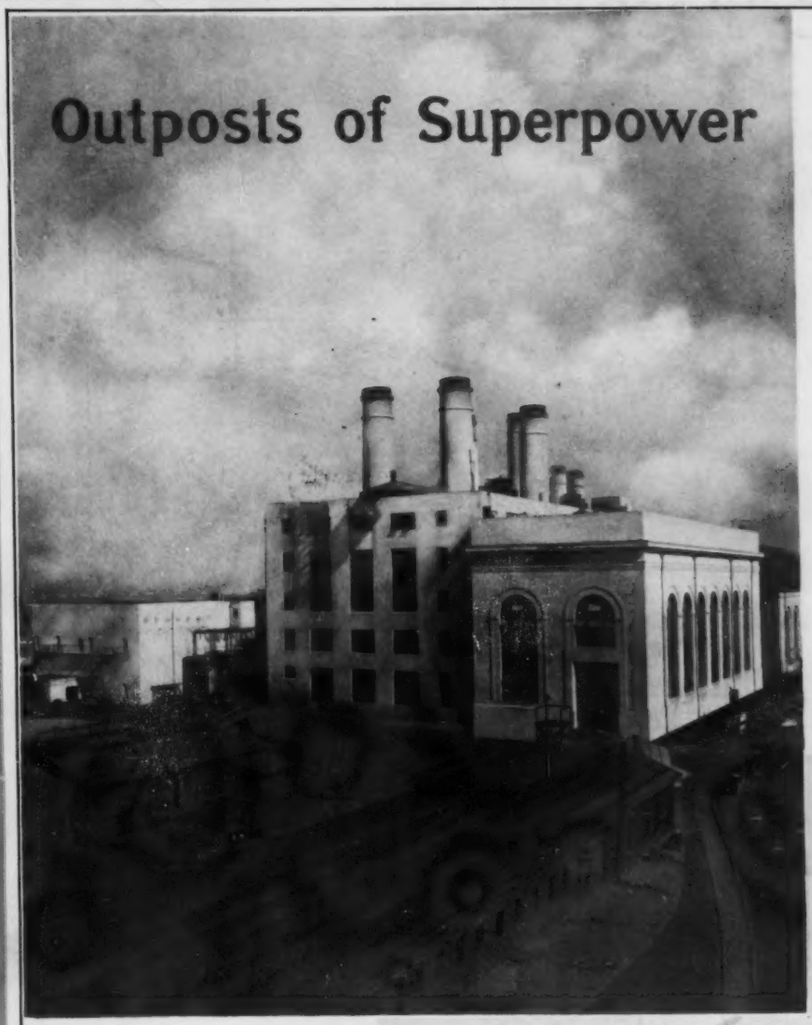
A McGraw-Hill Publication
San Francisco, Calif.

July 1, 1925
25 Cents

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



AT the left is the new Long Beach Station of the Southern California Edison Company of Los Angeles.

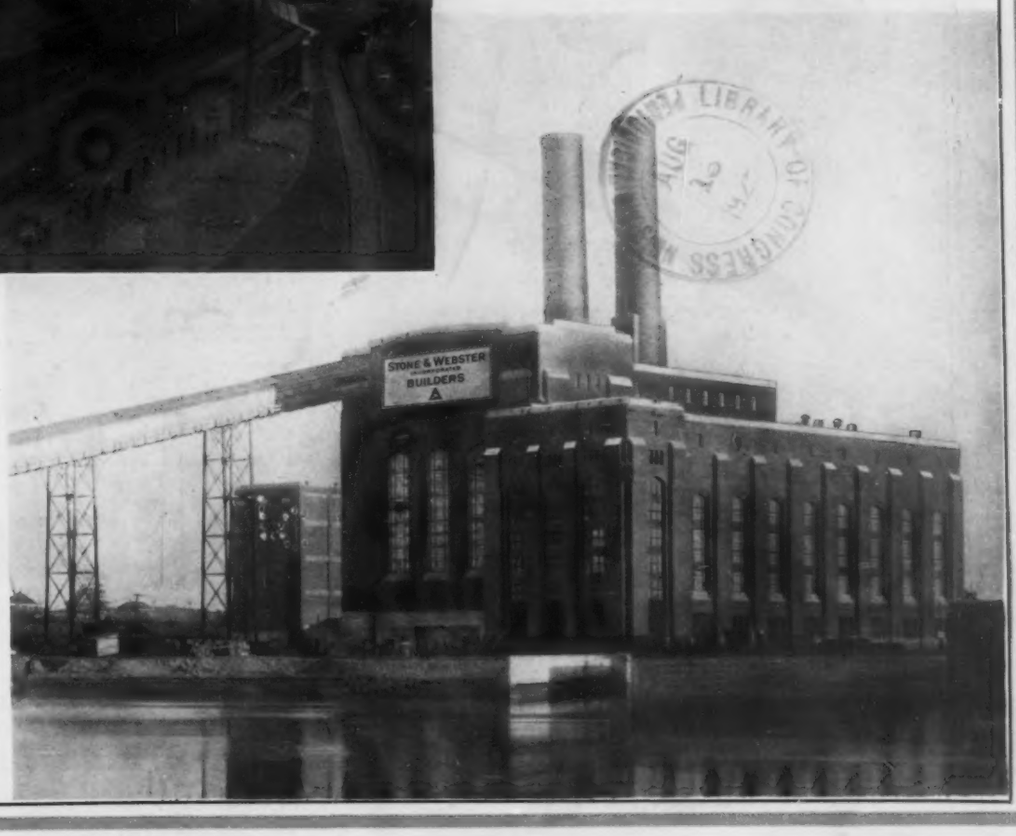
Below is the new Weymouth Station of the Boston Edison Company.

With the completion of these stations — outposts of superpower serving 3,000,000 people —the power construction work of Stone & Webster, Inc., throughout the country exceeds 2,250,000 horse power.

STONE & WEBSTER
INCORPORATED

NEW YORK CHICAGO BOSTON
SAN FRANCISCO PHILADELPHIA

DESIGN · BUILD
OPERATE
FINANCE



PINCO

"The Correct Design"

No. 265 — 88,000 Volts

MANUFACTURED BY

PORCELAIN INSULATOR CORPORATION

LIMA, NEW YORK

Pacific Coast Stocks Carried by

BAKER-JOSLYN COMPANY

DISTRIBUTERS

ELECTRICAL EQUIPMENT AND CONSTRUCTION MATERIALS

SEATTLE PORTLAND SAN FRANCISCO LOS ANGELES

Journal of Electricity entered as second class matter February 17, 1921, at the post office at San Francisco, under the Act of Congress, March 3, 1879.
Published the 1st and 15th of each month, at 883 Mission Street, San Francisco, California.

© Cl B664593

Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."

Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

JUL 15 '25

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

J. W. OTTERSON, Associate Editor
G. R. HENNINGER, Associate Editor

R. N. PHELAN, Associate Editor
B. H. SNOW, Northwest Editor

VOLUME 55 | SAN FRANCISCO, JULY 1, 1925 | NUMBER 1

Contents

Editorials 1

Year's Progress of Industry Recorded at Successful Convention 3

A report of the 48th convention of the National Electric Light Association, San Francisco, June 15-19, 1925

General Sessions 4

Public Policy Meeting 10

Public Relations Sessions 11

Commercial Sessions 16

Technical Sessions 19

Accounting Sessions 22

Hetch Hetchy Hydroelectric Development of the City of San Francisco 25

By P. J. OST

A description of the power project in connection with the Hetch Hetchy water-supply system of San Francisco, specializing on the 80,000-kva. Moccasin plant.

To Harness Small Streams 24

Ideas for the Contractor 31

News of the Industry 33

Meetings 37

Personals 38

McGRAW-HILL COMPANY OF CALIFORNIA — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

JAMES H. McGRAW, President | C. T. HUTCHINSON, Vice-Pres. & Gen. Mgr. | C. M. LINDSAY, Vice-Pres. & Treas.

Washington, Colorado Building
Chicago, 7 South Dearborn Street
Philadelphia, Real Estate Trust Building
Cleveland, Leader-News Building
St. Louis, Star Building
New York, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brasil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, $2.00 per year, 2 years $3.00. Elsewhere $3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Copyright, 1925
By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

McGRAW-HILL CO., Inc., New York
Publishers of
American Machinist—European Edition (*Published in London*)
Industrial Engineer (*Published in Chicago*)
Electrical Merchandising
Chemical and Metallurgical Engineering
American Machinist | Ingenieria Internacional
Electrical World | Electric Railway Journal
Engineering and Mining Journal-Press
Bus Transportation | Engineering News-Record
Coal Age | Radio Retailing | Power

San Francisco's Moccasin Hydro Station

NO recent power development has received the publicity which has been accorded the Moccasin plant of the City of San Francisco's Hetch Hetchy development. While the controversy arising over the plant has been largely political, the project itself merits careful study by the light and power industry because of its completeness and its many new engineering developments.

In this issue of the Journal of Electricity is a full and complete description of the new 80,000-kva. generating station. All reference to the political phase has been omitted by the author, one of the engineers engaged in the design and construction of the plant. We recommend it to our readers for careful study. This is the first engineering article to appear on the project since the plant has been ready to operate.

In keeping with its plan to present articles covering the new power developments in the West, the Journal of Electricity has some fine treats in store for its readers during the coming months. Articles will be printed describing the Pit No. 3 plant of the Pacific Gas and Electric Company, the Valmont steam plant of the Public Service Company of Colorado, the Mystic Lake plant of the Montana Power Company, the Copco No. 2 plant of The California Oregon Power Company, and the Skagit plant of the city of Seattle. All of these stations represent the latest in Western hydroelectric or steam practice and are material additions to the installed generating capacity of the states west of the Rockies.

EXPENDED FOR GROWING UTILITIES

$100,000,000 a Year Backed by Stone & Webster Experience

Pioneers for 35 Years

PUBLIC UTILITIES are successfully meeting a huge and fast-growing demand for electric light, power and transportation. Practically as old as the industry itself, the Stone & Webster organization has kept even pace with the extraordinary expansion of the utilities for thirty-five years.

Expenditures $100,000,000 Yearly

Over $100,000,000 yearly is expended through the Stone & Webster organization for public utilities construction, maintenance and operation. These activities extend into nearly every important State. The home office directing the financing, construction and operation of properties numbers 1500 people and occupies three acres of offices.

Operating Managers for 60 Companies

Stone & Webster provides operating management for sixty separate public utility corporations. The record of these properties is an accurate measure of Stone & Webster operating and engineering skill and of the soundness of Stone & Webster financing.

During the war the strength and soundness of the utilities was severely tested. The demand for power rose to unprecedented heights but new financing was impossible. Under these conditions the Stone & Webster companies achieved notable results in maintaining both their physical condition and their record of dividends.

Stone & Webster service is in demand the country over. These facts show its value.

Construction 2,000,000 Horse Power Reports on $4,500,000,000

Stone & Webster has examined and appraised properties to the total value of four and one-half billion dollars, including many of the country's foremost public utilities. Its construction of power stations aggregates 2,000,000 horse power.

The systems fed wholly or in part by these stations serve a population of 15,000,000—twice the population of New England. This includes 7,000,000 served by systems receiving power from Stone & Webster-built hydro-electric plants.

Power construction work in progress is a half million horse power. Three-quarters is for old customers who have learned that Stone & Webster-built stations pay dividends. This is because of the economy for which they are famous, and also because Stone & Webster knowledge based on actual experience of operating sixty widely-distributed utilities is available for extending old systems or planning new ones.

For Investors

The Securities Department of Stone & Webster rounds out and completes the organization's intimate contact with the public utilities industry. Through its operations in financing properties and handling their securities it provides thousands of individuals and institutions with favorable opportunities to invest their funds in electric light, power and transportation —fundamental necessities of modern life.

STONE & WEBSTER

INCORPORATED

DESIGN · BUILD
OPERATE
FINANCE

NEW YORK: 120 Broadway
SAN FRANCISCO: Holbrook Bldg.
CHICAGO: 38 South Dearborn Street
PHILADELPHIA: Real Estate Trust Bldg.
BOSTON: 147 Milk Street

EDITORIAL

Lessons of the N.E.L.A. Convention

THE forty-eighth convention of the National Electric Light Association held in San Francisco will go down into history as one of the most successful meetings ever held, a fine tribute to Frank A. Leach, Jr. and his committees for the hard work and attention to detail that made of the convention a smoothly running mechanism that performed its functions without a hitch at any time.

So much of unusual interest transpired at the convention that limitations of space prevent more than passing note. On other pages of this issue full reports of the various sessions will be found. The formal program arranged in New York by the officials of the N.E.L.A. was notable, particularly on account of the many national and international figures prominent in the world of power development, finance and economics. Few industrial organizations in the country could have received the recognition accorded to the N.E.L.A. by the presence on its list of speakers of two famous cabinet ministers and many other great leaders—a recognition of the growing importance of the electric light and power industry. According to A. Jackson Marshall, secretary of the N.E.L.A., the attendance at the sessions was higher than at any other convention, speaking in terms of the percentage of the total registration. This convention was a business convention, not a joy ride or a picnic, and the serious side of the meetings was recognized fully by those who attended.

To the many Western representatives of the electrical industry who were unable to attend the convention we recommend a careful study of the reports presented in this issue. Those who did attend will find in the events recorded herein a stimulus to their pleasant recollections of San Francisco and a permanent record of a week fruitful in concrete benefits to the electrical industry of the United States.

Los Angeles Creates Equity in Colorado River

THE voters of Los Angeles have uncovered a new municipal gopher hole into which the politicians can pour an unceasing stream of tax-raised dollars. Bonds to the extent of $2,000,000 recently have been passed by an overwhelming vote for the avowed purpose of investigating the possibilities of bringing a water supply into the city from the Colorado River. The obvious purpose of the bond issue was to commit the voters to a program of development of the river in which Los Angeles could and would participate. Conceivably, this is the initial step in a plan which will require many millions more of the public's dollars. Later there will be other bond issues with the politicians claiming that the money previously voted had been expended in accordance with the mandates of the people. The clinching argument will be that if additional bonds are not voted, the millions already spent will be wasted.

The favorable vote of the people of Los Angeles on this "revenue-producing municipal improvement" affords the politicians capital argument. They now can go to Washington and represent to Congress that Los Angeles is fully committed to the Swing-Johnson bill, including the high dam and the All-American Canal, and that the people have backed their indorsement of these projects with millions voted for construction purposes.

On the surface Los Angeles' interest in the project is from the standpoint of a municipal water supply. Those familiar with the situation are of the opinion that power and not water is the goal of the municipal-ownership advocates. It is admitted generally that what Los Angeles wants is the opportunity to generate power from the Colorado and wholesale it to other municipalities throughout southern California. If a dam is constructed, power-producing possibilities immediately are created, and the path is open for the Bureau of Power and Light to claim distribution rights for this energy, not only for the city of Los Angeles alone but for other cities as well.

This is but another example of the history of all municipal light and power enterprises. The true magnitude and ultimate cost of a development are concealed carefully from the voters in the beginning. As money is spent, more money is asked, each time in an increasing sum. The project contemplated by Los Angeles would cost at a most conservative estimate $150,000,000, yet the initial bond issue is for little more than one per cent of this sum. But $2,000,000 will create a public equity in the project which must be protected, and the politician has a smooth way about arguing points like this. Once the start is made there is no way out except at an immense public loss. We wonder how many private enterprises could be financed on such a basis?

THE power end of San Francisco's Hetch Hetchy water supply project. Moccasin power house is located near the Priest grade on the Big Oak Flat road to the Yosemite Valley, the road itself appearing on the hill in the left background. The plant accommodates four 20,000-kva. units at the present time. One of the Pacific Coast Steel towers is in the foreground.

Year's Progress of Industry Recorded at Successful Convention

WITH two cabinet members and a number of leaders in business and industrial life of the nation, in addition to men and women prominent in all branches of electrical industry, the forty-eighth convention of the National Electric Light Association was held in the Municipal Auditorium, San Francisco, June 15 to 19, 1925. The relatively small registration of 3,000 scarcely reflected the enthusiasm and interest of the delegates because some of the sessions were attended by greater numbers than ever have attended the sessions of former conventions. Scarcely ever have the optimists dominated N.E.L.A. gatherings to a greater extent and never has enthusiasm run so high.

FRANKLIN T. GRIFFITH

President of the Portland Electric Power Company who, as the retiring head of the N.E.L.A., presided at one of the most successful conventions in the history of the organization

First among the addresses by distinguished visitors was that of Herbert C. Hoover, Secretary of Commerce of the United States, who spoke on some of the political aspects of the central-station business before an audience of 6,000 at the Public Policy Committee Session on the evening of June 17. The part electricity can play in agriculture was the subject of an address by William M. Jardine, Secretary of Agriculture, before the third General Session the morning of June 18, while 3,000 public relations enthusiasts heard a symposium on "The Investor's Viewpoint," in which Haley Fisk, president, Metropolitan Life Insurance Company, and B. C. Forbes, Hearst Publications and Forbes Magazine, were among the principal speakers. Women's place in the industry was discussed at length by many women taking part in public-utility work, while Mrs. John D. Sherman, president, General Federation of Women's Clubs, Washington, D. C., represented the laywoman in this portion of the program, which occupied one afternoon session of the Public Relations Section. Commercial men found the sessions of their section filled to overflowing with load-building and revenue-producing ideas, and were loud in their praise of the committee work accomplished during the year, while Technical and Accounting Sections likewise proved of interest to the engineers and accountants. The details of the convention handled by a dozen or more local committees headed by Frank A. Leach, Jr., vice-president and general manager of the Pacific Gas and Electric Company, was so perfect as to call forth nothing put praise from those attending the sessions. Likewise, the program, handled by the New York office of the N.E.L.A., was characterized as the most noteworthy ever prepared for one of the Association's meetings. The program was so diversified that it is difficult to discern a predominating theme. Customer-ownership, rural electrification, better public relations, and regulation of utilities furnished topics for constructive material in the general sessions.

In the public relations sessions, rural service and the place of women in the industry were the central themes. Once again the convention went on record as believing that private ownership and operation with sound public regulation make for cheaper and better service.

In the commercial meetings the importance of the responsibility of this section of central-station business in maintaining prosperity and growth again was emphasized. From the load-building standpoint lighting, electric cooking and domestic refrigeration occupied the attention of sales executives.

The outstanding developments in engineering and operation were recorded in the technical sessions. Most of the reports dealt with improvements in economy of operation and reliability of service. The appointment of Col. William Kelly to the technical staff at headquarters met with general approval.

From a social standpoint Western hospitality played an important part in making the convention agreeable to the visiting delegates. The untiring efforts of committees charged with the entertainment of the guests left little to be wished for.

The general opinion of all in attendance may be summed up by the statement that the convention was an outstanding success in every department of its activities.

GENERAL SESSIONS

First General Session

An echo of 1915, the year of the last N.E.L.A. Convention in San Francisco, and of that other more tragic year, by which San Franciscans set all calendars, 1906, was brought into the opening session of the convention Tuesday morning. That echo was brought into the electrical assembly by way of contrast, and he who brought it in, Mayor James Rolph, Jr., did so to point to the achievements of the West, crushed by Nature's catastrophe, but indomitable and spurred on by such a blow.

Mayor Rolph's address of welcome to the delegates of the convention, a hearty and whole-hearted welcome, was followed by President Griffith's address. Few conventions have had the benefit of such scholarly and thorough survey of a past year as that presented by President Franklin T. Griffith before the session. The work of each section was reviewed in a comprehensive manner and the activities of the entire association in its many geographical sections summed up in such a way as to leave very little unsaid.

Reviewing first the beginnings of the association in 1885, with its membership of but sixty-five men and contrasting it with the present body, with a membership numbering over 15,000 men and women, President Griffith went on to say:

"The industry is doing more work now than it ever did before and doing it better than ever before. And this is in spite of increasing costs in all the materials which go into the production of electric energy, while rates have remained at the same or lower levels than in former years."

That this was due to the cooperative effort fostered by membership in the National Electric Light Association, was the intimation that he left with his hearers. He continued to show that these results had not been achieved without labor, that there had been dark days in the past, overcome by the indomitable spirit of American progress.

Griffith Discusses Superpower

Following a summary of the activities of the various sections of the association, President Griffith spoke briefly of some of the major problems confronting the industry. Of the much abused term, "superpower," he said:

"Its political aspects may be studied as long as you are on the mailing lists of your congressman."

Attention was called to the fact that the greatest progress in the field of so-called "superpower development" had been made on the Pacific Coast, and President Griffith took a sharp fling at the political demagogues who have been making capital out of "superpower" as a means toward general public ownership. He said:

> It is unfortunate that this subject has been so uniformly distorted and misrepresented by our political and socialistic friends who prey upon the imagination and ignorance of laymen, and universally find it expedient to ignore salient and stubborn facts.
>
> It is characteristic of this branch of our activities, as in all other phases of public utility business, that we are not permitted to do our day's work unmolested. For, while our engineers and technical forces are engaging their best skill and energy in pushing this movement forward along its natural economic pathway, the political gadflies buzz around our heads and jam their stingers into our anatomies with ever-increasing zest and zeal. It is quite unnecessary, save for purpose of emphasis, to call attention to the untruth of the contentions of the public ownership propagandists that the extension of superpower facilities will mean any immediate or prospective reduction of rates for the services furnished to our customers. This desirable goal may be reached eventually through the ability of the interconnecting companies to inaugurate greater economies in production and operation, but it is an exceedingly remote contingency at this time.

Derides Municipal Ownership

President Griffith also rapped the public ownership advocates, who are clamoring for unlimited water-power development, as follows:

> In every part of the country where there is a substantial amount of undeveloped water power, we are continually confronted with a mass of harmful propaganda relating to the cost of power and the militant doctrinaries who feel themselves and the public on the pap of public ownership are exploiting their theory and not the practical aspects of superpower in support of their contentions. There are hosts of writers and speakers on water-power subjects who freely assert that water power is the cheapest form of energy, and that its development necessarily means the establishment of power-consuming industries in districts having an abundance of potential water power.

Treasurer W. A. Jones followed with his report, in which he advocated the increasing of membership dues to care for association expenses, which have been in excess of revenues for the past few years.

Section Chairmen Report

M. S. Sloan, chairman of the Public Relations Section, in an excellent speech, reviewed the work of his section during the year and described the important part which public relations must play in future activities of the Association. "The very size and importance and prosperity of our industry make us a shining mark which is being shot at," he said, and then went on to show the means whereby public relations were being improved through the committee work of his section.

W. Paxton Little followed with an excellent resume of the activities of the Accounting National Section, laying stress on the section's work for a uniform classification of accounts and a standardization of annual reports to utility regulatory commissions.

W. R. Putnam, chairman of the Commercial National Section, in his report described the Commercial Section's study of conditions confronting the industrty due to increasing loads on types of service which have low load factor and cost a great deal to serve. The seeking of means to fill out the "valleys" in the production curve, the building up of off-peak business, he showed, was drawing particular attention from the section at present.

H. P. Liversidge, chairman of the Technical National Section, wound up the committee reports for the morning. He described the Technical Section's work as serial, with study continuing through from one administration to another. A total of twenty-three serial reports had been completed last year, he showed. The appointment of a Director of Engineering was recommended by this section, he pointed out.

Second General Session

"How long should a wife live?" "How to keep 'em down on the farm," developments in lamp manufacture, and how group insurance helps establish better relations, were among the subjects discussed at the second general session Wednesday morning. Besides the presentation of four important reports, addresses were heard from Col. William Kelly, Hon. W. D. B. Ainey and Bruce Barton (by proxy).

The report of the Educational Committee was presented by its chairman, Fred R. Jenkins, Commonwealth Edison Company, Chicago. A continuing demand on the part of member companies for the various courses for employees has been manifest through the year, and a total of 1,897 subscriptions to the six courses offered by the committee was recorded in 1924, which was the largest in any year in the history of the committee.

Among the high spots of the report of the Rate Research Committtee, presented by Alex Dow, Detroit Edison Company, Detroit, Mich., chairman, was in that portion of the report devoted to rural rates containing the suggestion that the congested urban districts should bear some portion of the cost of rural service, paying somewhat more in rates than they would pay if rural territory were not served. Citing the desirability of electrifying the farm as a means to keep labor on the farm, it was stated that rural rates should be constructed with consideration for the ideas of the farmer.

In the report of the Insurance Committee, headed by Charles B. Scott, Bureau of Safety, Chicago, the services rendered to the member companies in connection with their fire and liability insurance problems were discussed. Among the activities of the committee was a study of group life insurance, a detailed report being submitted without recommendations as an introduction of the subject to the companies. It was suggested that both the employer and employee have responsibilities and interests that may be combined in solution through some form of this insurance.

A reduction of about 40 per cent in the price of lamps since Jan. 1, 1922, a portion of which occurred during the past year, was brought out as an outstanding achievement of the lamp manufacturers in the report of the Lamp Committee, presented by Frank W. Smith, United Electric Light & Power Company, New York, chairman. The report listed a number of developments in lamp manufacture, and called attention to the attempt now in progress among manufacturers to standardize sizes with a view to reducing the number of sizes produced.

Bruce Barton's Paper Read

Money spent by the light and power companies for advertising is as well invested as money spent for fire insurance or set aside for plant depreciation in the opinion of Bruce Barton, president, Barton, Durstine & Osborne, New York, in a paper read by M. H. Aylesworth in the absence of Mr. Barton. According to Mr. Barton no plant can depreciate as fast as good will. The second portion of Mr. Barton's paper was devoted to the subject of women and from it the paper got its name, "How Long Should a Wife Live?" He urged that today is the time for the electrification of the home, saying that "every day that we lose in this business of electrifying homes costs the nation in its richest wealth—the training of children, the lives and happiness of mothers." He pointed out that in the early days of this country the homes had two or three mothers and no motors. He concluded by saying:

> The home of the future will lay all of its tiresome, routine burdens on the shoulders of electrical machines, freeing mothers for their real work, which is motherhood. The mothers of the future will live to a ripe old age and keep their youth and beauty to the end.

Judge Ainey Speaks

Hon. W. D. B. Ainey, chairman of the Public Service Commission of Pennsylvania and president of the National Association of Railway and Utilities Commissioners, forewarned the industry against the movement for federal regulation of the light and power industry. He sounded a warning note for utility commissions themselves when he said:

> To meet the present pressure of a new development in an extended use of electricity for domestic and industrial use state commissions must awaken to a deeper sense of commission duty and responsibility. Their laws must be strengthened where now they are weak. Their administration must be wise, constructive and fearless, freed from the bias of politics and actuated by no other desire than to maintain that fair balance between the utilities under their jurisdictions and the public which is entitled to receive adequate utility service at reasonable rates. And once more, unless the public, the utility companies and the state commissions cooperatively undertake to support the more intimate regulatory policies which state commissions alone can apply, then some other answer will be found of much less advantage to the public and to all concerned—the lodgment of all or nearly all regulatory authority in some agency to be created and sitting in Washington.

Third General Session

Rural electrification, the Home Lighting Contest and the announcement of the various prize awards were the chief features of the third general session of the convention Thursday morning. The importance of the problem of rural electrification was impressed upon the audience by W. M. Jardine, Secretary of Agriculture, and L. J. Taber, Master of the National Grange.

W. H. Onken, Jr., editor Electrical World, reported for the prize awards committee. The following awards were made by the committee for the year:

Doherty Medal

Allen T. Early, Illinois Power & Light Corporation, Collinsville, Ill., for his paper, "A Manager's Privileges and Responsibilities."

Harriet Billings ($50) Award

Albert J. Vogle, Commonwealth Edison Company, Chicago, Ill., for his paper, "The Basis of Our Industry."

H. M. Byllesby ($250, $150 and $100) Awards

1—J. A. Rockwood, Portland Electric Power Company, Portland, Ore., for his paper, "Increasing the Usefulness of the Accountant to the Public-Utility Industry."

2—H. L. Gruehn, Consolidated Gas, Electric Light & Power Company, Baltimore, Md., for his paper, "Development of Analysis."

3—P. O. Johnson, Minneapolis General Electric Company, Minneapolis, Minn., for his paper, "The Accountant in Public-Utility Work."

Martin J. Insull ($250) Award

Richard F. Kunkel, Commonwealth Edison Company, Chicago, Ill., for his paper, "How Sound Public Relations Between Public Utilities and Committees Can Best Be Developed and Maintained."

James H. McGraw ($250, $150, $100) Awards

1—R. H. Lang, Consolidated Gas, Electric Light & Power Company, Baltimore, Md., for his paper, "Provisions Made for Continuity of Electric Service."

2—Francis E. Andrews, Public Service Company of Northern Illinois, Chicago, Ill., for his paper, "Transmission Tower-Line Engineering and Construction."

3—W. F. Oberhuber, Philadelphia Electric Company, Philadelphia, Pa., for his paper, "Factors of Operating Efficiency and Economy with Particular Reference to Maintenance of Power-House Equipment."

Arthur Williams ($250) Award

Nathan Roberts, Ohio Public Service Company, Cleveland, Ohio, for his paper, "Industrial Electric Heat."

Frank W. Smith ($100) Prize

Franklin C. Eteson, Blackstone Valley Gas & Electric Company, Pawtucket, R. I.

Home Lighting Contest for Central Station Employees

1—Miss Helen E. Beisel, Nebraska Power Company, Omaha, Nebr., $500.

2—Clyde N. Robinson, Public Service Company of Northern Illinois, Chicago, Ill., $300.

3—H. C. Cox, Kansas Gas & Electric Company, El Dorado, Kan., $200.

The winners of the Bonbright prize were announced by President Griffith. The $10,000 in prizes for the best papers reviewing the progress of the electric light and power industry for the decade 1920-30 offered by Bonbright & Company, New York, follow:

First prize, $5,000: David Cowan, investment department, Sun Life Insurance Company of Canada, Montreal.

Second prize, $1,000: R. M. Davis, statistical editor, Electrical World, New York.

Third prize, $500: John Dockendorf, statistical division, Milwaukee Electric Railway & Light Company, Milwaukee.

Ten prizes, $250 each:

Reuben B. Sleight, engineer Minnesota Tax Commission, Minneapolis, Minn.

Arthur R. Stubbs and Charles H. Churchill, Jr., in collaboration and working with the assistance of seven of their assocites, all of the Adirondack Power & Light Company, Schenectady, N. Y.

C. E. Neil, of the publicity department of the North American Company, and Charles Donaldson of Curtis, Fredric & Belknap, New York City, working in collaboration.

M. L. Sindeband and P. Spron, of the American Gas & Electric Company, New York, working in collaboration.

A. K. Baylor, of the merchandising department of the General Electric Company, New York.

C. P. Dunn, designing engineer, Portland Electric Power Company, Portland, Ore.

C. T. Chenery, New York City.

Theodore Dwight of Murray & Flood, New York, and Reginal Trautschold of Montclair, N. J., in collaboration.

David Evans, Jr., Montclair, N. J.

M. J. Verdery, Jr., of Bonbright & Company, New York, and H. A. Moe of New York, in collaboration.

Ten prizes of $100 each:

F. E. Pierce and R. T. Dana, Construction Service Company, New York, in collaboration.

Merrill E. Skinner, commercial manager, Duquesne Light Company, Pittsburgh, Pa.

Paul A. Ryan, Susquehanna, Pa.

Pearson Winslow, Bonbright & Company, New York.

Louis R. Davis, secretary, Business Research Corporation, Chicago, Ill.

Chester M. Clark, Boston Banking House, Boston, Mass.

Edgar A. Van Dusen, hydraulic and structural engineering, Central Hudson Gas & Electric Company, Poughkeepsie, N. Y.

Prof. T. H. Dillon, professor of public utility management, Graduate School of Business Administration, Harvard University.

Theodore H. Brown, Stamford, Conn.

Frank H. Simmons, Blackstone Valley Gas & Electric Company, Woonsocket, R. I.

In a letter addressed to W. R. Putnam, Idaho Power Company, Boise, chairman of the Commercial National Section, Edwin N. Hurley, president of the Hurley Machine Company, Chicago, announced the donation of a fund of $10,000 to the N.E.L.A. to be offered to the electric light and power company which, during the next year, develops the most constructive method of merchandising electric appliances. The fund has been offered as a stimulant toward the improvement of methods of distribution.

One of the most outstanding features of the Home Lighting Contest has been the manner in which the industry has kept faith with the public, according to the report of J. E. Davidson, Nebraska Power Company, Omaha, chairman of the Lighting Educational Committee. Throughout the contest there was no propaganda of any kind, Mr. Davidson reported. He stated that 74 per cent of the population served by electricity was organized for the contest. The advertising value of the contest publicity to the industry is in excess of $4,000,000.

Following his report, Mr. Davidson presented to Miss Julia Groo of Portland a replica of the $15,000 electrical home which she won in the contest. In her remarks of acceptance Miss Groo urged that the industry continue its efforts to educate the children and the women of the home regarding better home lighting. A check for $1,000 was presented to John F. Gilcrest, Commonwealth Edison Company, Chicago, as the regional director whose section made the best showing in the contest.

Public misconception regarding the development of the nation's water powers can be overcome only by giving the people a proper understanding of the relations between the power companies and the state and federal governments, according to Wigginton E. Creed, president, Pacific Gas and Electric Company, and chairman of the Water Power Committee. This report says:

> The public should be educated to a realization that the power company has installed its plants and built its lines in the public interest, and by doing so it has merely reduced the energy of mountain streams to the service of the public. It should know that each step of the way is safeguarded; that no federal right or property is given up or parted with; that state water is not taken unless it can be shown that by its taking the public is benefited.

The report showed that power developments authorized by the Federal Power Commission but not yet begun will require at least a billion dollars to complete and two billion dollars more for transmission lines and distribution systems. Applications now pending will require ten billions for the development of the 20,000,000 hp. and the construction of transmission and distribution systems. Rapid as has been the development of the industry, it is obvious that only a portion of this power can be utilized in the time limit set by law. The report censures such

a practice, classing it as speculation in federal power permits. In this respect the report states that it would be in the public interest to clothe the Federal Power Commission with some latitude of discrimination in the issuance of permits and licenses, authorizing only developments of utilities supplying service and in a position to utilize the power applied for or isolated industries which can show that the power to be developed will be put to a beneficial and efficient use.

Regarding the co-ordination of steam and hydroelectric developments, the report says:

> While water power cannot be expected to supplant any appreciable amount of steam, it is growing more and more apparent that the development of water power will to a considerable and increasing extent depend upon steam reserves to carry peak loads and to provide service in the event of interruptions to the water supply or the transmission circuits. * * * * *
>
> Hydroelectric development in this Western area will gradually extend to more remote streams and to streams of less dependable flow. The result will be a greater reliance upon steam power. Reserves once considered ample will no longer safeguard service and more and larger sources of auxiliary or emergency power will become necessary. * * * * *
>
> The policy of the federal government with respect to water power development has been clearly defined and the principle of state regulation firmly established. The continued development and utilization of these resources will hereafter depend largely upon local conditions. Each project must be considered in the light of its cost as compared with the cost of alternative sources of power that may be available. Generally speaking, in the East and South water power will be developed as an auxiliary to, and occasionally as a substitute for, steam wherever economic conditions make it practical. In the West water power will continue to be the primary source of power, but will rely to an increasing extent upon steam to ensure continuity of service.

In conclusion the report said:

> It perhaps cannot be too often repeated that in the development of water power the course of the industry has been steadily upward. Great scientific advances have been made and innumerable physical obstacles overcome. Always the goal has been towards cheaper and better service.
>
> All that has been accomplished has been done through private courage and initiative. Nothing like it could have been attained through the restricting influences of government ownership, federal, state or municipal. Thinking people know this and today see less need for government management or ownership than ever before. As President Coolidge once said: "The government and its agents are not in possession of any resources, ability, wisdom or altruism except that which they secure from private life."

The portion of the meeting devoted to rural electrification was opened by G. C. Neff, Wisconsin Power, Light & Heat Company, Madison, chairman of the Rural Electric Service Committee, who presented a report which showed that there is 50,000,000 primary horsepower on the farms of the United States, producing sixteen billion horsepower-hours of work costing the farmer three billion dollars, or approximately 25 cents a kw-hr. Owing to the diversification, this load could be carried by one-quarter of that amount of central-station capacity. It is estimated that 2,000,000 hp. or four per cent of this load is served electrically. If electric motors were to replace steam and gas engine-driven equipment, this could be increased to 12,000,000 hp.

The report recommends that any utility starting a rural electrification drive should organize a rural department in charge of a man who is familiar with rural problems. Before lines are built, it is recommended that careful surveys be made. Rural rates should be based upon a standard which will protect the utility investment and at the same time be favorable to the farmer. It urges that utilities finance the construction of rural distribution lines wherever possible and that the necessary help be given the national and state Committees on the Relation of Electricity to Agriculture so that the work being carried on at the present time may be continued.

Presenting the second annual report of the Committee on the Relation of Electricity to Agriculture, E. A. White, director of the committee, stated that "committees organized for the specific purpose of making a comprehensive study of the rural electric service problem are functioning in seventeen states —New Hampshire, New York, Virginia, Alabama, Ohio, Indiana, Illinois, Wisconsin, Minnesota, South Dakota, Iowa, Kansas, Oklahoma, California, Oregon, Washington and Idaho. The interest in the subject is not confined to any particular region or type of farming, and, according to the speaker, rural electric service is receiving attention in many foreign countries.

Discussing the number of farms that are within the reach of central-station lines, Mr. White stated that at least 25 per cent of the 6,484,383 farms in the United States were so situated. To reach approximately 1,500,000 of these farms with electric service, Mr. White considered that three farms could be reached with each mile of line. Construction charges, estimated at $1,000 per mile of distribution line, would amount to $500,000,000 to reach less than one-fourth of the country's farms. He continued:

> Data now available leave no doubts that to use electric service properly the individual farmer should spend for wiring and equipment at least two dollars for every dollar which goes into distribution lines. Here is $1,000,000,000. Adding these two sums, we find that to make rural electric service at all effective, on less than 25 per cent of our farms, is a financial undertaking of $1,500,000,000, or four times the money spent by the United States in building the Panama Canal. Certainly an undertaking of such magnitude calls for ability of no mean order. Eeach group, agriculture, your light and power industry, equipment manufacturers, will be justified in taking more than a casual glance before it leaps.

National Grange Leader Speaks

Stating that the American farmer is anxious to secure the benefits of electricity for his family and workmen, L. J. Taber, Master of the National Grange, discussed the possibilities of electric service on the farms of this country. In his opinion the electrification of the farm will be an inestimable boon to agriculture and will offer one of the greatest potential markets to the electrical industry.

In discussing practical means of securing this farm electrification Mr. Taber said:

> Let us remember that we should seek to develop good will and understanding, and to this end power companies and manufacturers should recognize basic facts. Agriculture must not be exploited either in developing the right of way or equipment. The rate contract should be simple and understandable; the farmer will want to figure his own bills. Development costs must be paid, but the farmer must not be asked to experiment.
>
> Light and power companies need rural-minded men in connection with the business affairs. This is especially true when exercising the right of eminent domain. We American farmers retain strongly that Anglo-Saxon instinct that makes us feel that our farm is our castle, and we feel that power lines should not be placed over our farms without proper

compensation and without the use of the current carried. In figuring rates and in rural extension and in recommending farm uequipment, the power companies should rely upon men with a knowledge of farm problems.

This meeting and the movements that will flow from its committees and its activities can be of incalculable value; first, in developing better understanding between agriculture, the power interests and the manufacturers; second, in making clear the problems that affect the farmer; and third, the working out of a program that will benefit agriculture and the industries involved.

Mr. Taber stated that in the past the central stations and the manufacturers of electrical equipment have given more attention to meeting industrial needs than they have to solving the problems of the farmer. Electric service means more to agriculture than to almost any other industry, and the Master of the National Grange is of the opinion that farm electrification warrants increasing attention from the entire electrical industry.

Rural Electrification Discussed by Secretary Jardine

Stating that as much primary power was available on the farms of the United States as is available to the manufacturing and electric power industries combined, W. M. Jardine, Secretary of Agriculture, brought out the fact that agriculturists are handicapped seriously in the efficient utilization of this power. The seasonal character of the demand and the need for decentralized operations have brought about a very low power load factor and a relatively high cost per unit of power utilized.

That the electrification of agricultural operations would aid in the solution of the problem concerning the provision of more power for this service, was suggested by Secretary Jardine who said:

The adoption by agriculture of electrical distribution of its power would appear to be one means of overcoming some of these difficulties if certain other difficulties connected with the distribution of electrical energy can first be overcome. The relatively high cost of transmission-line construction, coupled with the low load factor obtained, the mobile nature of many of the farm operations, and the lack of fundamental information on which to base the charges for the current consumed, have prevented the wide application of this type of power to farm operation. The best information available would indicate that in the United States something like 500,000 farms are at the present time equipped with some kind of electrical power service. Here in California, where rates are somewhat more favorable, and where the type of agriculture lends itself more easily to the utilization of electrical power, I understand fully fifty per cent of the farms have this service and that the amount of electrical energy utilized annually is practically equal to that supplied by both animal and tractor power combined.

The most serious difficulty connected with the distribution of electrical energy to rural communities seems to be to get the average customer to use sufficient current to give the central stations a reasonable return on their investment without making an unreasonably high charge per unit of energy consumed. In most cases, when a rural line has been constructed the farmers have availed themselves of it for supplying lights to their houses and barns and perhaps for the operation of a few small machines requiring little current, but they have not extended its use farther. Obviously, the central service stations cannot be expected to invest money in rural service extension unless they receive a reasonable return on their investment. On the other hand, it must be recognized that agriculture cannot utilize electrical energy extensively unless its cost and the returns from its use are such as to make the practice profitable. The farmer has a keen understanding of relative power costs as they apply to his conditions and he employs only those practices that yield the larger profit.

After calling attention to the fact that it was essential that the consumption of each rural customer be increased to warrant the expense of line extentions, the Secretary stated that in his opinion the only way for electricity to compete with other types of power is to accomplish the work as economically. His suggestions as to ways of reducing the costs of electric service in rural communities included the adoption of the most economical types of transmission systems consistent with good service and public safety, and the manufacture of electrical equipment designed to fit agricultural conditions. In closing he stated that "the farm opens the greatest potential opportunity open to the electrical industry."

Fourth General Session

At the fourth general session Friday, June 19, the report of the wiring committee was summarized by A. Jackson Marshall, secretary of the National Electric Light Association, in the absence of R. S. Hale, The Edison Electric Illuminating Company, Boston, chairman of the committee. Among the more important matters discussed by this committee during the year were the principle that new developments should not be put in the Code until they have been tried out by local inspection departments, and the acceptance of the idea of thorough grounding of the neutral.

John W. Lieb, New York Edison Company, New York, gave the report of the N.E.L.A. representative to the United States Chamber of Commerce. He mentioned some of the work accomplished by some of the bureaus, including the agricultural and the business ethics bureau, the latter covering a code of sound business conduct.

Mr. Lieb also reported for the National Industrial Conference Board, whose work covers scientific industrial economic research. During the last year he stated it had expanded considerably and had received the affiliation of several governmental departments. He mentioned particularly their work regarding trade associations and the establishment of uniform medical provisions in the workmen's compensation laws in the various states.

The report of the memorial committee was given by W. H. Onken, Jr., editor, Electrical World, and chairman of the committee. Mr. Onken told of the accompishments and ideals of those distinguished members of the industry who have died during the last year. Included among the more prominent names on this list were Benjamin G. Lamme, Milan R. Bump, Lucian L. Nunn, John L. Harper and James A. Lighthipe.

Railroad Electrification Discussed

W. S. Murray, Murray & Flood, New York, presented the report of the committee on electrification of steam railroads in the absence of Frank R. Coates, chairman of the committee. This report includes a statement made by Herbert Hoover, Secretary of Commerce, before the American Institute of Electrical Engineers, in which he urged that standardization in fundamentals be made because of the benefits it will return and because of the large losses it will prevent. It presented the accomplishments which have been made in steam road electrification

in the United States, and a statement of the contemplated electrification. An outline was included of what has been accomplished abroad in the electrification of steam roads. The committee urged that a study of the problem be made by representatives of both the railroads and the utilities and suggested this be done by a committee of the American Railway Association and the National Electric Light Association, each committee of which could operate individually and collectively as a joint committee in the consideration of the principles involved.

Mr. Murray also delivered an address on the subject of servicing railroad electrification. He stated that electrification was especially advantageous in zones of heavy congestion. He urged that the electrical industry meet the railroads more than half way and that they make this their problem. He stated that the finances of the railroads were in such a condition that they cannot spend the great sums necessary for electrification; that investment dollars could not be spent to save dollars lost in operation. He said the electrical industry should lift the burden as much as possible, and suggested one means of doing this would be to supply power direct to a standardized overhead contact system.

Paul S. Clapp, U. S. Department of Commerce, Washington, D. C., addressed the meeting on steam railroad electrification. He stated the problem was one of great importance as it reaches into national and industrial relations, and must be approached with a realization of the public obligation involved. He said most of the work would rest with the railroads themselves, but they must be aided in every way possible by the electric utilities and the manufacturers. He stated the railroads are our largest undertaking representing an investment of over $21,000,000,000. Mr. Clapp pointed out that electrification would be facilitated by action in two major directions: first, the development of interconnected central-station systems, as a source of power supply; and secondly, by the adoption of certain standards which will enable the development of a unified transportation system and simplify the equipment.

Paul Shoup, vice-president of the Southern Pacific Company, San Francisco, gave an address on the necessity of moving on. He stated the organizations with which he was affiliated were already interested in electrification and have had experience in the value of it. He emphasized the important role played by the railroads in the life of the nation. Actual figures were presented by him to show that there was nothing excessive or prohibitive in the freight rates as they now exist. He also stated it would not be a burden on the people to protect themselves and at the same time enable the railroads to earn an adequate return on their investment. Mr. Shoup called attention to the losses which have been caused the railroads in recent years by the equalization of rates. He said the public must have a broad view of the needs of the transportation industry and its relation to national life.

W. S. Murray presented a resolution providing the establishment of a committee to study the problem of steam railroad electrification with a primary objective of recommending possible standard types of power to be supplied overhead contact systems, this committee to report at the 1926 convention of the National Electric Light Association. The resolution also suggested that representatives be secured from the following organizations to serve on this committee: American Railroad Association, National Association of Railroad and Utilities Commissioners, National Electric Light Association, American Telephone and Telegraph Association, American Institute of Electrical Engineers, and the Department of Commerce.

W. D. B. Ainey, president National Association of Railway and Utilities Commissioners, stated that administrative problems must be left on the shoulders of men in the industry. He said regulatory bodies were needed but that they should not have managerial control.

Shun Suzuki, manager, department of foreign relations, Toho Electric Power Company, Ltd., Tokyo, Japan, addressed the meeting on the Japanese electrical industry and American finance. He spoke of the recent flotation of a $15,000,000 bond issue in this country, stating this was done because cheaper capital could be secured for longer periods. He expressed a desire to have the electrical industry in this country cooperate with that of Japan in aiding its development. He said the interests of American investors were safeguarded in bonds in Japanese public utilities.

Martin J. Insull, Midwest Utilities Company, Chicago, presented the report of the nominating committee as follows: president, J. E. Davidson, Nebraska Power Company, Omaha, Nebr.; vice-president, R. F. Pack, Northern States Power Company, Minneapolis, Minn.; vice-president, H. T. Sands, Charles H. Tenney & Company, Boston, Mass.; vice-president, P. S. Arkwright, Georgia Railway & Power Company, Atlanta, Ga.; vice-president, J. B. Miller, Southern California Edison Company, Los Angeles, Calif.; treasurer, W. A. Jones, Henry L. Doherty & Company, New York; executive committee members for three years ending June 30, 1928; Edwin Gruhl, North American Company, New York; E. M. Herr, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.; and H. M. Edwards, New York Edison Company, New York City; executive committee members for one year ending June 30, 1926: Clyde L. Chamblin, California Electrical Construction Company, San Francisco, Calif.; and W. E. Robertson, Robertson Cataract Company, Buffalo, N. Y.

Other members of the national executive committee are: managing director—M. H. Aylesworth, National Electric Light Association, New York; secretary—A. Jackson Marshall, National Electric Light Association, New York; members at large—Franklin T. Griffith, Portland Electric Power Company, Portland, Ore.; H. C. Abell, Electric Bond & Share Company, New York; W. A. Layman, Wagner Electric Corporation, St. Louis, Mo.; E. W. Lloyd, Commonwealth Edison Company, Chicago, Ill.; I. E. Moultrop, Edison Electric Illuminating Company, Boston, Mass.; and Harry Reid, Interstate Public Service Company, Indianapolis, Ind.

PUBLIC POLICY MEETING

Upholding state regulation as opposed to federal regulation as a wholly unnecessary invasion of local responsibility, Herbert C. Hoover, Secretary of Commerce, took issue with the advocates of municipal, state and government ownership of the electric light and power industry before 6,000 people at the public policy committee meeting Wednesday night. The speech was broadcast over KGO.

In reviewing the revolution now taking place in the power industry as the result of development of long-distance transmission and consequent economies from the erection of large central generating stations and interconnection of distributing systems, Secretary Hoover said:

I do not propose to refer to this as either "superpower" or "giant power." Both these terms are blamed with connoting something that is not existent in power production. "Superpower" has been envisaged as some overwhelming sinister encroachment into public rights. "Giant" power has been interpreted by extremists to be like any giant hitherto known, having its only realism as a bogey, as entertainment for children, or as a sideshow for the political circus. However, the practical everyday fact is that all this development is simply a centralization of power houses and interconnection of distributing systems. We had better stick to our engineering terms to describe what the thing really is—central generation and interconnection of distribution systems. If anybody can find evil or humor or poetry in these terms, he will need to be ingenious.

Regulation of Utilities

He stated that central generation and interconnection do not in any way alter the essential character of regulation. He continued:

During the past year the Department of Commerce has been engaged upon a study into the effectiveness and the results of state regulation of the industry. It is scarcely necessary for me to say that there is either state or municipal regulation of the rates of electrical utilities in all but two of the states, and of service in all but five of the states. The financial operations of such utilities are supervised and controlled in a large majority of the states. These principles are being rapidly extended over the few remaining states.

It seems to me that there are two final tests of this question. First: Is the service adequate and is the industry progressive in its provision for future need? Second: Are the rates reasonable in themselves and are the profits taken by the industry upon the capital invested extortionate?

In the national sense the industry is acquitting itself well in service. Its initiative in scientific investigation, in application of discovery, its extension of service, is of the highest order of Amercan business. The service leads all others in the world and it improves every year.

As to the reasonableness of rates, it may be observed that the nation-wide average shows that rates are today slightly below pre-war, and this despite an increase of 100 per cent in wages, together with increased cost of fuel and of many supplies. While the price per kilowatt has shown a small decline since before the war, yet beyond this the technical improvement in lamps has resulted in a four-fold increase in the amount of light dispensed for the same money.

It has been proposed that as power districts may be no respecters of state lines, we must have federal regulation of power. I do not agree with the conclusion that federal regulation is necessary. I can see no reason for the imposition of a superior regulation, merely because the Congress may have the power to exercise its authority under the commerce clause. There are the most weighty of reasons against federal regulation. Power is by necessity bound to be local in its districts—as to its service, its generation and distribution. It differs widely from the interstate implications of the railways where they are dependent not upon districts but upon whole groups of states. Local acquaintance, local valuation and public opinion can operate upon power to their fullest extent. Nothing will produce worse service than to attempt to transfer local problems to absentee solution at Washington. And if our democracy will stand at all it must stand upon the local responsibility. Nothing could be a more hideous extension of centralization in the federal government than to thus undermine the state utility commissions and state responsibilities.

Regulation of Municipal Plants

He recommended that in those states where municipally owned plants are immune from state regulation that they should be required to maintain uniform accounting and submit their accounts to the state commissions in order to enable the local communities to judge the competency of their managers and for the nation properly to judge the value of municipal ownership versus private ownership. He pointed out that municipal plants cover but three per cent of the power being generated in the country.

He recommended that no embargoes should be placed on the free flow of power across state boundaries, pointing out that it is against the long view interest of the originating state. He strongly recommended that there should be immediate cooperation between state utility commissions and the industry for full and complete study of the resources and demand of every state in order that long view plans may be made for the location of central steam plants under the most economic conditions.

Interconnection Developing

He emphasized the necessity of the industry taking in hand the development of the spread of power to the farms and rural development generally. He said:

Concurrent with the expansion of central generation has been the evolution of the power district as distinguished from the individual town system. The outlines of these regional power districts have emerged in probably 50 per cent of the important power consuming areas of the country.

The wider interconnection between these regional systems is also proceeding apace. For this again makes use of the power capacity below the peak load by an interstate diversification. Such a flow of electricity will soon be traceable through the many regional systems continuously from Montana west to the Pacific, thence south to Mexico—a total of 1,800 miles. Shortly, power tie-ins will be completed in the Middle West and the Southeastern areas, coursing all the way from Wisconsin and Michigan around through West Virginia and North Carolina to Arkansas and Louisiana.

A still larger amount of the horsepower now produced in local factories will be displaced by purchase from central stations. We are just entering the stage of electrification of transportation. Present users will increase their requirements, new uses will be discovered. The power district as distinguished from the town systems is making possible the extension of service to the farms. At our present rate of increased requirements, by 1930 central stations for the country will probably need an additional capacity of fully 30 per cent, carrying them up to nearly 36 million horsepower. Probably five billion dollars of additional investment will be required.

The most of this increase will be supplied by steam generation. The public is generally under some illusion as to our water power resources. In the districts east of the Mississippi, where 76 per cent of our power of all kinds is generated today, if every drop of water that is economically useful were actually harnessed they could supply less than 15 per cent of the requirements.

The complete test of Secretary Hoover's address will appear in the July 15 issue of the Journal of Electricity.

Prior to Secretary Hoover's address, Martin J. Insull, Middle West Utilities Company, Chicago, read the report of the public policy committee. The report emphasized the importance to the industry of

the rural electrification program and customer-ownership and pointed out the dangers of federal regulation and municipal, state and government ownership.

Coffin Medal Awarded

A third feature of the meeting was the presentation of the Charles A. Coffin Medal to the Consumers Power Company of Jackson, Mich. The award was made by President Griffith to T. A. Kenney, vice-president of the company.

This is the second year that the medal has gone to a Middle Western company, it having been won last year by the Public Service Company of Northern Illinois. It was won the first year by the Southern California Edison Company. The Consumers Power Company is the third utility to join the distinguished group made possible by the Charles A. Coffin Foundation organized by the General Electric Company.

Among the achievements of this company, outlined by President Griffith as the basis of the award were:

It increased its consumers by 11 per cent during the year bringing the total to 200,000, residing in 170 communities. This increase was paralleled by an increase in kw-hr. to resident consumers of 21 per cent and to commercial consumers of over 17 per cent. Eighty-seven per cent of the homes in the territory served now have been electrified.

During 1924 the company completed a home-service visiting campaign, during which over 167,000 visits to customers were made by employees. Nine-

Franklin T. Griffith, N.E.L.A. president, presented the Coffin Medal to T. A. Kenney, vice-president of the Consumers Power Company—the 1924 winner of the award.

ty-eight and four-tenths per cent of the customers expressed satisfaction with the service that was being rendered, showing a 57 per cent decrease in complaints over the previous year.

Great activity was displayed in promoting efficiency by reducing the number of accidents and the number of hours lost due to accidents during 1924 was reduced 43.8 per cent over 1923. One hundred meetings on the subject of accident prevention were held and many bulletins were sent out.

The number of employees of the company owning stock increased 23 per cent during the year. The company has 17,966 customer-stockholders, representing a gain of 55 per cent in the number of holders in a year.

Its expenditures in 1924 in order to build greater service totaled $12,700,000. During the year over 244 miles of transmission lines were built of which 123 miles carry 140,000 volts. Distribution facilities increased 13.5 per cent. Its 1924 projects included five new 140,000-volt substations.

Considerable public approval was secured as a result of the reforestation of the territory surrounding its hydroelectric plants. The company has gone out of its way to aid in the propagation of fish in the streams near its hydro stations and has established camping accommodations for tourists.

In addition to the certificate of award, the company received a check for $1,000 for its Employees' Benefit Association.

PUBLIC RELATIONS SESSIONS

In a program of three sessions, colorful with the names of men and women prominent in business and public life of the nation, the Public Relations Section completed the most significant and instructive presentation of its problems in its history. If one single impression of all the meetings was stamped deeper than any other on the composite consciousness of the thousands of delegates that attended them, it was perhaps that the subject was so large that only by crowding the allotted time to the limit was the section able to cover all phases of its work.

M. S. SLOAN
Chairman, Public Relations Section

New light was thrown on such subjects as the relation of investment and finance to public relations, the place of women in the industry, the disssemination of information to the public, the value of utility and manufacturers' advertising, relations with educational institutions, customer-ownership, and employee relations, while in the words of such men and women as Haley Fiske, B. C. Forbes, Francis E. Frothingham, Henry Swift Ives, Henry M. Robinson, and Mrs. John D. Sherman was found reflected the favorable attitude of the enlightened layman toward the activities of the Public Relations Section and its place in the N.E.L.A.

No mention of the work of the section for the year would be complete without reference to its chairman, M. S. Sloan, Brooklyn Edison Company, Inc., Brooklyn, N. Y., whose administration was commended particularly by the nominating committee when it expressed the hope that the section might have the benefit of his leadership for another year.

First Public Relations Session

The prosperity of the electrical industry depends on the extent to which the good will of the public is

procured and maintained. This is the most serious and permanent problem confronting the industry today. With these statements, chairman M. S. Sloan opened the first session of this section, held in the afternoon of June 16. He showed that the problem was to make the public understand that the utilities were not primarily working for their own pockets, but that they were placing "responsibility before profits."

The first report presented was that of the committee on cooperation with educational institutions, by John C. Parker, Brooklyn Edison Company, Inc., chairman. The report showed that the work of the committee had been directed toward "bringing about a better and closer relation between the industry and schools of business administration and departments of economics in the higher educational institutions."

Advertising

Next followed the report of the manufacturers' advertising committee, presented by P. L. Thomson, Western Electric Company, New York, in the absence of J. C. McQuiston, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., chairman. In this it was brought out that during the year 60 manufacturers had assisted in telling the utility story to the public through advertising. Exhibits were shown of some of this material and the case of three advertisers who consistently had kept up a good will advertising program for the utilties throughout the year was cited. These were Westinghouse Electric & Manufacturing Company, General Electric Company and Western Electric Company.

The report of the advertising survey committee followed, being presented by George F. Oxley, publicity director of the N.E.L.A., in place of the chairman of the committee, Joseph B. Groce, The Edison Electric Illuminating Company, Boston, who was absent. Mr. Oxley stated that approximately $7,000,000 was spent last year by the utility companies in advertising, of which one-half was spent for newspaper space. He explained, however, that these figures could not be established as absolutely accurate, as they were based on returns from only about one-fifth of the total gross revenue represented by the companies questioned, and suggested that the committee be continued for another year in the hope of getting more complete information by that time.

Industrial Relations and Public Speaking

The first report of the newly formed industrial relations committee was next presented by its chairman, Homer E. Niesz, Commonwealth Edison Company, Chicago. The scope of the work of this committee, embracing 177 subjects under nine general heads, was outlined for a study to be carried on over a period of years, and preliminary reports covering this year's work were presented on the following subjects: "Employment," "Compensation," "Education and Training" and "Pensions." The report concluded by pointing out the advantages that would accrue to the employees, the companies and the public from a continued study of the "problems of management pertaining to the human relations in the industry."

Injecting a little general discussion at this point, Hugh M. Blain, New Orleans, La., made the point that the key to good public relations was through accessibility of the chief executives, saying that much public relations work could be nullified by a policy on the part of executives making themselves inaccessible to the public.

W. S. Vivian, Middle West Utilities Company, Chicago, chairman of the public speaking committee, was next called upon for his report, and supplemented the printed report by the statement that although 6,000 audiences, aggregating 900,000 persons, were reached by utility talks during 1924, still this was not enough, and the companies should continue to expand this activity in the future. He told of many instances illustrating the value of this activity, and cited evidences that the work of the committee was making progress.

State Information Bureaus

The regular program of the session being completed, Mr. Sloan then turned the meeting over to Bernard J. Mullaney, Commonwealth Edison Company, Chicago, director of the Illinois Committee on Public Utility Information, for an impromptu discussion of the work of the various state committees. By way of opening the discussion Mr. Mullaney suggested that it would be appropriate to hear either from executives as to the class of work these committees were doing, or from the directors of the bureaus as to the class of material they were getting from the companies to be disseminated.

An interesting discussion was precipitated, in which the following directors of state bureaus took part: F. W. Crone, New York; B. E. Ling, Ohio, and J. B. Sheridan, Missouri. Mr. Ling introduced Miss Helen Steiner, advertising manager, Ohio Public Service Company, Lorain, Ohio, who had been active in carrying the message of the utilities to the public through speaking engagements at civic clubs and other organizations. Miss Steiner told entertainingly how easily this was done.

The standpoint of the executives toward the work of the state bureaus was expressed by Marshall E. Sampsell, Central Illinois Public Service Company, Chicago; Frank L. Blanchard, Henry L. Doherty & Company, New York; H. T. Sands, Charles H. Tenney & Company, Boston, and L. O. Ripley, Kansas Gas & Electric Company, Wichita. The discussion brought out the following salient facts: that the material sent out by the state bureaus should not be too "high brow," but should be simple facts that can be understood readily by the ordinary reader; that propaganda, in the common meaning of the word, should not be sent out, because it becomes news only when quoted from a public utterance of a speaker; that only true information should be included in the material disseminated by the bureaus, and that this should be repeated over and over.

Second Public Relations Session

Before the largest audience ever assembled at a public relations session of the N.E.L.A. a battery of speakers, chosen from the highest ranks of the country's financiers, presented a symposium entitled, "The Investor's Viewpoint," to 3,000 persons at the second session, June 17. All angles of the investment and financing phases of the public-utility business were presented by leaders of institutions representing four classes of investors, most of whom were men outside the electrical industry who had traveled across the continent for the occasion.

The first report was that of the customer-ownership committee, presented by A. Emory Wishon, San Joaquin Light & Power Corporation, Fresno, Calif. Because of the length of the program, Mr. Wishon did not read the report, but referred those interested to the printed copy of it, saying that it contained the best thought of the best minds in the industry on the subject.

The report of the committee on relations with financial institutions, presented by M. S. Sloan, chairman, told of the activities of that committee in establishing better understanding between the electrical industry and the institutions that invested in its securities. Among the more important phases of the work was that which had to do with the preparation and suggestion of legislation designed to permit savings banks to invest in public utility securities in those states where such legislation was necessary.

The Investor's Viewpoint

This concluded the association reports for the meeting, and the chairman announced the symposium in which the first speaker was Haley Fiske, president of the Metropolitan Life Insurance Company, New York City. Mr. Fiske told of the growing regard in which the insurance companies hold the securities of the light and power companies. He recounted instances in which the insurance companies were doing an outstanding service to the electrical industry in bringing before the public the advantages of the use of electricity, and also in disseminating information among their policyholders, telling of some of the problems of the utility companies, thereby supplementing the public relations work done by the electrical industry.

The participation in utility financing of another class of investor in public utility securities was discussed by Henry M. Robinson, president of the First National Bank, Los Angeles. From the point of view of the commercial bank, he told of the part played by this class of institutions in raising the vast sums necessary to the progress of the industry. He showed how the commercial banks were called upon to do much of the temporary financing in bringing any project to a point where enough property had been created to warrant issuance of the longer term classes of securities, and also how these institutions were called upon to help in various emergencies that arose in operation and construction.

The view of the customer-owner was expressed by B. C. Forbes, Hearst publications and the Forbes Magazine, New York, whose address followed. Mr. Forbes likened the utility operator to a tight-rope walker, hovering on the verge of a fall in two directions, attempting to satisfy the customer with lower rates and the customer-owner with higher dividends.

Presenting some figures on the growth of the customer-ownership movement, he averred that these figures reflected the growing confidence of the public in the utility business, saying that this fact charges the operators with grave responsibilities which he felt would be met.

Mr. Forbes brought out the fact that, in his opinion, central-station merchandising was imminent. In so doing he stated that he thought that it was the customer's point of view that he would rather deal with someone who would have a continuing interest

Some members of the electrical industry caught by the camera at the N.E.L.A. convention in San Francisco. Reading from left to right—Alex Dow, president, The Detroit Edison Company, Detroit, Mich.; Frank W. Smith, vice-president and general manager, The United Electric Light & Power Company, New York City; Mrs. Frank W. Smith; E. M. Herr, president, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; and Judge W. D. B. Ainey, chairman, Pennsylvania Utility Commission, and president, National Association of Utility Commissioners.

in the workability of his appliance rather than just a momentary one.

Frothingham and Mitchell Speak

The investment house was represented in the discussion by Francis E. Frothingham, vice-president of Coffin & Burr, Boston, whose address was a complete exposition of the best accepted methods of financing. He said that, when cautiously administered, the utility business offers a quality of investment second only in safety to government securities. He showed that this feeling of investment bankers has not always existed, but has come about after an eradication of evils in financing and operation which existed in the early days of the infancy of the business.

After the end of the regular program Chairman Sloan called on S. Z. Mitchell, president of the Electric Bond & Share Company, New York City, for an impromptu discussion. Mr. Mitchell pointed the way to a solution of the problem advanced by Mr. Forbes, saying that the way to get lower rates and higher dividends was first to give good service to the customer, and strive for economy of management and operation. Two ways to gain economy, he said, were by interconnection and the avoidance of unnecessary duplication of investment such as occurs when more than one company serves the same territory. The economic necessity of holding companies he explained by saying that the grouping of smaller operating companies under one head procured for the possible investor a greater security due to diversity of earnings.

At the end of Mr. Forbes' address he took occasion to announce the winner of the Forbes Magazine contest for the best record in public relations work of any public utility in the United States. The award of a handsome silver cup was made to the Alabama Power Company, Birmingham, Ala., and was accepted for the company by W. E. Mitchell, assistant general manager, who stated, in accepting the trophy, that he desired to pass on the credit for this success to the rank and file of employees who were responsible for it.

Third Public Relations Session

The third session of the Public Relations section was particularly interesting, due to the fact that the women of the industry took a prominent part in it. In a brief speech M. S. Sloan, chairman, introduced Miss R. E. McKee, Middle West Utilities Company, Chicago, as chairman of the Women's Committee, and turned the meeting over to her.

Miss McKee, reporting on the work for the year, which was the fourth of the Women's Committee's existence, stated that the committee's chief aim had been the education of utility women so that they might be capable of telling the story of the industry to the public through the channels of women's clubs, parent-teacher associations, civic bodies and similar organizations. She said that in many instances the women of the industry form the only contact with the public and that by familiarizing these women with the fundamentals of the business and showing them the importance of their relation with the consumer makes for good public relations. Miss McKee stated that her committee endorsed a repetition of last year's program. She then introduced Miss Sophia Malicki, also of the Middle West Utilities Company.

Miss Malicki dwelt on the importance of the establishment of local women's committees. She stated that some companies were not willing to allow the organization of such committees and that such companies evidently did not realize the importance of the contact between the women of the industry and the women of the community; that the utility women could help raise the community standard of living, and that through representation in women's clubs they could spread the utility message. Miss Malicki concluded by saying that the Women's Committee stands ready to help the light and power industry.

The chairman of the Women's Committee of the Great Lakes Division, Mrs. P. W. Evans, Interstate Public Service Company, Indianapolis, Ind., was the next speaker. She stated that a total of approximately 3,000 women employees of utilities in the states of Michigan, Wisconsin, Illinois and Indiana had attended meetings of the committee. Some of the activities carried on by the committee covered speeches to women's clubs, parent-teacher associations, and similar organizations, participation in safety campaigns, personal service work among women employees, weekly bulletins containing present-day information, contests to enlist the interest of women, the formation of classes in better English and public speaking. Mrs. Evans stated that when new properties were acquired the Women's Committee was of material benefit in acquainting new employees with the work. The following topics have been chosen by the committee for study and discussion: holding companies, superpower, customer-ownership, highway lighting and rural lighting. Mrs. Evans closed her remarks by stating that "the strength of the Women's Committee lies in service to our customers and in service to our companies."

Miss Ruth Morris of the Georgia Railway & Power Company, Atlanta, Ga., the next speaker, said that, as the majority of the women employees of her section were comparatively young, elementary courses in subjects were necessary; that classes in public speaking had been formed, essay contests had been conducted, and principles of the utility business were being studied.

The chairman of the Southwestern Division, Mrs. Bess Brooks, Oklahoma Gas & Electric Company, Oklahoma City, said that there are 545 women in that division, 88 of whom are Class A members of the N.E.L.A., and that 35 committees had been formed. Special attention has been given to public speaking, first-aid methods and securities selling. Mrs. Brooks stated monthly meetings were held, with interesting programs, including discussions by department heads; that essay contests, lectures, demonstrations and speeches before schools, civic bodies and small social gatherings were used to spread the utility message, and that she felt the outstanding accomplishment of the organization was proving the power of the spoken word.

Mrs. John D. Sherman, president, General Federation of Women's Clubs, Washington, D. C., stressed the importance of home-making and the vast potential power inherent in a combination of that organization with the National Electric Light Association when directed toward the raising of the standard of the American home. She emphasized the great opportunity before the light and power industry and its proportionate responsibility. Mrs. Sherman said that the federation's first step in the work was the starting of a nation-wide survey of home-making methods and facilities prevailing in the homes in the United States. This survey is being conducted as far as possible through the agency of and through contact with the public utilities officials, whose cooperation has been sought as a means of arousing the women of the nation to a renewed appreciation of the vital importance of public utilities to the business of domestic efficiency. Mrs. Sherman also stated that a further purpose of the survey is to convince Congress that the decennial population census should give periodically the salient facts about the equipment of the American home with the essentials of the efficient conduct of the business of home-making, and that if this should be accomplished the information would be available to public utilities officials "in the continued adaption of public utilities functions to American home demands." Mrs. Sherman concluded her remarks with the following significant statement: "Home-making in the United States today is the greatest industry in the world—and its improvement is a challenge to Uncle Sam and to such groups as are represented in the National Electric Light Association and the General Federation of Women's Clubs."

The next speaker, Miss Isabell Davie, chairman Women's Committee, Middle West Division, urged that in the future particular attention be devoted to the development of women speakers, saying that properly selected and carefully trained girls could be made just as effective as, or more effective than, men speakers before certain bodies, such as school audiences, women's clubs, mixed meetings and sometimes businessmen's associations. She stated that no industry in the world has a more inspiring message than the electric light and power industry—the message of service—and that by developing natural, simple and sincere speakers with pleasing personalities this message can be carried to the general public. In the discussion that followed, Miss Gertrude Thibodeau of the Malden Electric Company, Malden, Mass., Miss M. S. Fletemeyer of the Northern Indiana Gas & Electric Company, Hammond, Ind., and Miss Elizabeth Lee of the Alabama Power Company, Birmingham, Ala., stressed this note of service and told what the women in their sections were doing to carry the utility message.

"The Better Half of the Industry" was the subject presented by Mrs. L. A. McArthur, wife of the vice-president and general manager of the Pacific Power & Light Company, Portland, Ore. The speaker dwelt on what women may do in the future in conjunction with the men of the industry and suggested that the qualities that make women good housekeepers fit them to help in industrial housekeeping. Mrs. McArthur pointed out that feminine tact, patience and perseverance are qualities that could be used to good advantage in the electrical industry, and stressed the amount of good that the women of the industry can do toward helping win the public away from the idea of political ownership and "convert it to an unswerving loyalty to the initiative, energy and vision which have been one of the foremost civilizing factors in our national life."

Miss Helen Steiner, of The Ohio Public Service Company, Lorain, Ohio., Miss Frances Emans, of the Southern California Edison Company, Los Angeles, Calif., and Miss Helen Norris, of the Commonwealth Edison Company, Chicago, Ill., took part in the discussion which followed, emphasizing the fact that women are a factor in the industry and that the women who have come into it through marriage are interested in the work of their husbands and are an especially advantageous channel through which to tell the industry's story of service.

This concluded the women's share in the program, and Miss McKee turned the meeting over to Mr. Sloan. After a short complimentary speech on the work of the women, he stated that the report of the nominating committee had been made at the previous meeting and then introduced Henry Swift Ives, vice-president, Casualty Information Clearing House, Chicago, whose subject was, "Protecting the Right to Own." Mr. Ives brought out the fact that public utilities and public service corporations constantly are being attacked through the right to own and that in proptecting themselves they are protecting all property owners. He stated that the chief menace of the right to own is the government-ownership movement, emphasized the lack of cooperation between the industries most in jeopardy, and added that already there has been a large measure of cooperation along educational lines between the electrical industry and the casualty insurance business. He suggested that a Private Ownership League which would unite all property owners might be a feasible method by which to protect the right to own.

Discussion on "The Public Be—Told" was participated in by Harry Reid, of the Interstate Public Service Company, Indianapolis, Ind., and chairman, Indiana Committee on Public Utility Information, who said that not only the advertising department but every department in the organization must take part in the job of instilling a lively interest in the general problem of educating the public; by Bernard J. Mullaney, of the Commonwealth Edison Company, Chicago, and director Illinois Committee on Public Utility Information, who made the point that the fight to protect the right to own will not be made successfully nor won quickly unless those in contact with it bring home to all the other property owners the fact that it is also their fight and that the only way to do that is to tell the people; and by Miss Julia Pailet, of the New Orleans Public Service, Inc., New Orleans, who contrasted the old era of antagonism between the public and business with the present regime in which industry, with service as its motto, strives to help the public. She stated that good public relations could be attained by giving the public a square deal and letting them know they were

getting it, and outlined some of the ways in which women were helping do this.

COMMERCIAL SESSIONS

No such enthusiasm has been seen in the Commercial Section for many years as was witnessed during the three sessions held by this section during this convention. There has been a stirring of the spirit this year that is putting heart into the commercial men after a long period of apathy, and it was crystalized into voice and action in San Francisco when the subject of merchandising came before the Association. That a new era of commercial activity had dawned and new opportunities in the cooking, refrigeration, lighting and transportation fields were being unfolded was the opinion of a dozen or more old-timers of the commercial branch of the industry who rose to pay tribute to the work of a number of the committees reporting this year.

W. R. PUTNAM
Chairman, Commercial Section

First Commercial Session

The first session called to order by the section chairman, W. R. Putnam, Idaho Power Company, Boise, was the largest commercial meeting within the memory of the members, and the most encouraging and inspiring. The reports of the electric cooking and heating committee and the appliance committee were presented, and a stirring keynote speech on merchandising electrical appliances was delivered by Edward N. Hurley, chairman of the board of directors of the Hurley Machine Company, Chicago.

The opening address of the chairman, W. R. Putnam, was very brief, devoted principally to pointing out the good progress that has been made this year in increasing the interest of the geographic sections in active work co-ordinated with the national program, and appealing for a further expansion of the geographic committee work.

The program of the industrial lighting committee, representing central stations, manufacturers, jobbers, contractor-dealers and other interests concerned with the development of better illumination, the conservation of eyesight, etc., was outlined by Joseph F. Becker, United Electric Light & Power Company, chairman, who discussed in detail the plans for the national advertising of this industrial lighting campaign, which is to begin on Sept. 1 of this year. One hundred thousand dollars has been established as a fund for the promotion of this campaign, with the alluring prospect of $45,000,000 additional revenue possible of development in this field.

Range Survey in Northwest

The status of the range survey which is being conducted in the Northwest was described by A. C. McMicken, Portland Electric Power Company, chairman of the electric cooking and heating committee. Owing to difficulties encountered in developing the necessary instruments for recording the tests, it is only possible to record the progress of this field survey which is being conducted by 150 ranges in Spokane, Wash., and 150 ranges in rural territory near Boise, Idaho. The objective of this study is to develop facts on range and water-heater loads, to determine adequate rates for this class of business, to develop experience with metering water heaters and in the servicing of ranges and water heaters. Charts showing the character of range load under investigation were presented by Lewis A. Lewis, Washington Water Power Company, chairman of the Northwestern geographic section committee.

George Hughes, Edison Electric Appliance Company, Inc., and Merrill Morrow, Westinghouse Electric & Manufacturing Company, representing the range manufacturers who have financed this survey in large part, expressed their satisfaction and enthusiasm on the work that the committee is doing. Discussion brought out the fact that the average consumption per electrical range is 490 kw-hr. per month as against 400 kw-hr. for light and other appliances. The average consumption for a manually operated water heater is 210 kw-hr. and 800 kw-hr. for an automatic water heater. Mr. Lewis stated that the range load in Spokane is worth today $500,000 in actual annual revenue.

Hurley Addresses Meeting

Opening with the statement that the study of merchandising is the greatest commercial and economic problem before the people of the United States today, E. N. Hurley made a strong appeal for consideration of the sales problem of the central station industry. At the present time, he said $2,000,000,000 worth of merchandise is constantly in transit in freight cars in the United States. Owing to the improvement in efficiency of the railroads this is 20 per cent less than the investment which was tied up in this process of distribution five years ago. If here such practical economic benefits can be credited to improved methods of distribution, the same efficiency must be developed in the electrical industry through cooperation between the manufacturers and their customers.

At the present time $350,000,000 is invested in the manufacture of electrical appliances. The securities of these manufacturers, no less than those of the utility companies, are owned by the public and are an element in public relations of the industry. A satisfied user of electric light, he said, is doubly satisfied by the use of appliances also, and the merchandising of appliances gives the greatest opportunity for improving public relations within the reach of the central station industry today aside from any consideration of its revenue value. Forty-nine of the central stations now sell merchandise. If the other 51 per cent also assume leadership in the sale of appliances a great stimulus will be brought to the electrical industry.

Appliance Committee Report

The report of the appliance committee was presented as a combined address and demonstration, the

purpose being to show the value of appliance load and to indicate the fundamentals of sales policy in practice. Strong intent of purpose is the first essential of a sales campaign, said Thos. W. Berger, Philadelphia Electric Company, chairman, and appliance selling is not keeping pace with the growth of the industry because central station organizations are not thoroughly sold on the merits of appliances as a load and as merchandise. To determine in actual practice the influence of appliance load on residence income a detailed survey has been made this year in the city of Cincinnati by the study of 100 accounts of minimum or small-bill customers whose bills had suddenly increased. T. L. Phillips, of Cincinnati, vice-chairman, presented the findings in a series of extremely interesting charts and a dramatic demonstration of the logic of developing domestic appliance business that won tumultuous applause and a rising vote of thanks.

Having presented the logic of this appliance business, Mr. Berger, in an inspiring address, outlined methods by which the business may be secured, analyzing the function of advertising in this field, stressing the fact that results cannot be achieved through the maintenance of traditional dignity in advertising. There is no dignity in the sale of an appliance of a vacuum cleaner for $1 down, he said, yet it is a very human transaction, and the salesman must talk the simple language of the people in developing this market.

John F. Gilchrist, Chicago, in the general discussion which followed, pointed out the benefit that comes with increased domestic appliance loads in the improvement of load factor.

Earl E. Whitehorne, New York, appealed for a broader purpose in appliance selling that would set up a practical program for complete equipment of the home. The key to the situation, he said, will be to guide the public to recognize that the larger electrical equipment may be purchased when the house is built and financed through the mortgage, and that the auxiliary smaller equipment can be financed through a regular program of budget appropriation that will acquire these appliances in sensible sequence.

W. R. Putnam, chairman, indorsing this suggestion, cited a recent study of 750 homes, the purpose being to determine to what extent appliances were installed. It was found that these homes were equipped only to the extent of thirty per cent. He estimated that at the present rate of progress it will take thirty years to equip fully the homes on existing lines throughout the country. Yet the development of this opportunity offers not less than five billion dollars in sales to the electrical industry of the United States.

Second Commercial Session

Electrical refrigeration occupied the center of the stage in the second session of the Commercial Section, the afternoon of June 17. Attendance was not as large as at the opening session, owing to the competition of a very popular program in the main auditorium under the auspices of the Public Relations Section. The subject of refrigeration, however, is probably the livest issue before the central station commercial man today, and the presentation of the committee's report was followed with keenest interest. A. T. Waterfall, vice-president of the Dodge Motor Car Company, of Detroit, addressed the meeting and told what the large power user thinks of the central station.

The session opened with a report of the customer relations committee presented by F. F. Kellogg, Duquesne Light Company, Pittsburgh. The report reviewed the purpose of the customer relations committee and the work they have done to bring home through the employees of the industry, the importance of the contact made with the users of electric service. In the course of this work a series of customer relations suggestions has been published, about one a month, to inform the members of the methods and experience of progressive companies.

E. W. Lloyd, Commonwealth Edison Company, Chicago, in the discussion stressed the importance of attention to the appearance of the men who represent the company. M. R. Griffith, Boston, pointed out that the chief contact between the employees and the public involves employees who receive the least training in their attitude toward the public. It is easy enough, he said, to tell the employee to be polite and to keep himself clean, but this means one thing to the repair man and another thing to the counter clerk. Instructions therefore should be made exceedingly specific.

Refrigeration Report

George E. Miller, Electric Illuminating Company, Cleveland, presented briefly the report of the refrigeration committee, outlining the scope of the investigation which has been made. He gave particular emphasis to the fact that a central station cannot afford to experiment in refrigeration, but should make its selection of a machine on the basis of known facts; also, that the light and power industry is concerned vitally that the manufacturers of electrical machinery should prosper and build up refrigeration on a firm economic basis.

Chairmen of subcommittees who were present reviewed the work of their part of the study which the committee has made, embracing a survey of the equipment on the market, active engineering tests of the principal refrigerators now in production, the experience of a large number of installations throughout the country, and a review of the commercial methods employed in the development of the refrigeration market.

Angus McLay, Detroit, stated that the average cost of ice in 42 cities is 60 cents and that the cost of ice in a test refrigerator was $84, as compared with $64 for the same ice box equipped with an electrical refrigerating unit.

Manufacturers Heard From

G. M. Dwelley, Kelvinator Company, Detroit, congratulated the committee on its work and said that the manufacture of electrical refrigerators this year will pass the total sales of electrical ranges. He estimates that there will be 75,000 domestic refrigerators sold this year and 25,000 ice cream cabinets.

This means $500,000 added to the central station revenue this year, and a total of $3,000,000 annual revenue on all refrigerators so far sold.

G. E. Durban, Frigidaire Corporation, Dayton, said that we have reached the time when it is no longer necessary for manufacturers to sell the idea of the value of the load to the central station industry. The manufacturer now is concerned chiefly in finding out how he may best cooperate with the utility man.

H. G. Seaver, Servel Corporation, New York, said that there is no question but what 10,000,000 refrigerators will be sold in America during the next ten years. The speed with which this market is developed depends largely on how much support the refrigeration industry receives during the pioneering period.

J. R. Lovejoy, General Electric Company, Schenectady, told of a number of recent luncheon meetings at which Charles R. Coffin had gathered together prominent men of the central-station industry to discuss the value of the electrical refrigerator to the stockholders of the central stations. The electrical refrigerator is bringing a new era in the development of electricity in the home, and it comes in good time to assist the public utility that meets the high cost of service under present conditions.

Report of Power Committee

In presenting the report of the power committee, V. M. F. Tallman, Boston, threw on the screen a chart showing the comparative activities in different sections of the country that are being directed toward the power research. In the east central geographic division, the Pacific Coast division and in New England, far greater attention is being given the power field than elsewhere in the country. This, he says, is the result of active leadership locally. He appealed for the service of more young men in this branch of the business.

A. T. Waterfall, vice-president of the Dodge Motor Car Company, Detroit, told of the experience of that company with central-station service. The Dodge company consumes two million dollars' worth of electric power annually, having 12,000 hp. in motors installed. This company formerly operated its own plant, then came an accident and they realized the advantages of the resources offered by dependable central-station service. The central-station industry, he said, is relatively where the automobile industry was when it was manufacturing cars that had to be cranked by hand. It went through all the grief in the development of the self-starter which this industry must face in working out the problem of electrical refrigeration and electrical industrial heating. The American public is very intelligent, however. When they find out what electrical refrigeration and industrial electric heat is or how electrical refrigeration and industrial electric heat can benefit them, the market will develop rapidly.

Third Commercial Session

Several fields for building load, particularly off-peak load, were surveyed in the third session of the Commercial Section, June 18. Reports covering electric truck transportation, street and highway lighting, residence lighting and lighting campaigns, and discussions on these subjects were received with enthusiasm by the delegates, while a discussion on ways and means of increasing attendance at Commercial Section sessions furnished an entertaining interlude not on the program.

The first report to be presented was that of the transportation committee, by its chairman, B. J. Martin, Commonwealth Edison Company, Chicago, who told of the possibilities in building load for utilities through promoting the use of electric trucks. He pointed out that the charging current for truck batteries was used through the night, thus helping to fill the early-morning valley. Selling the electric transportation to the industry, he said, should receive consideration of all commercial men.

In commenting on the work done by the geographic division committees, Mr. Martin especially commended the work of the Pacific Coast Electrical Association. He introduced J. S. Moulton, San Joaquin Light & Power Corporation, chairman of that committee, who told of the survey of the possibilities of the field conducted in California, and explained the methods of conducting the two truck schools. Representatives of the manufacturers of electric trucks, in discussing this report, commended the work done by the national committee, making the point that the essential element in selling electric truck transportation was to survey the field to see where electric trucks could best fit into the picture, and then concentrate on that territory.

Discussion on Attendance at Sessions

The small attendance at commercial sessions was decried by E. W. Lloyd, Commonwealth Edison Company, Chicago, when he was called upon as chairman of the nominating committee to offer the names of fifteen section members from which to choose the section chairman and executive committee. Mr. Lloyd invited discussion to see if the reasons for this small attendance could be discovered and if a remedy could be found. Such discussion developed that the holding of parallel sessions with the Public Relations sessions was the principal reason, since many commeriial men also were much interested in public relations. It was suggested that the next year's executive committee of the Commercial Section take steps to remedy this situation by a rearrangement of the general convention program so that these two important sections with so much in common be not required to hold their meetings at the same time.

Street and Highway Lighting

The report of the street and highway lighting committee, presented by its chairman, E. W. Lloyd, pointed out among other things the opportunity for central stations to increase revenue by more intensive development of the street lighting business. It called attention to the fact that a 400-cp. lamp would consume approximately 800 kw-hr. per annum, which at 3c per kw-hr. would produce $24 gross revenue, or a revenue equal to the average obtained from a small residential customer.

Relations with civic authorities and with groups

of citizens, and methods of financing street lighting improvements, were among the more important subjects discussed by the report, while a model plan for a typical city was presented in detail, as a part of the report by the Public Service Company of Northern Illinois.

"The question of highway lighting is receiving attention in the more congested areas of the country and still it is practically a virgin field," said the report in considering this newer application of lighting energy. It was pointed out that the transportation of freight on the highways at night was one of the reasons for the development of highway lighting.

In discussing the report, L. A. S. Wood, Westinghouse Electric & Manufacturing Company, South Bend, Ind., recommended that cities be required to help finance investment in street-lighting equipment, through bond issues or otherwise, so as to relieve the central-station rate for lighting of the burden of providing the carrying charges on this investment, thus keeping the street-lighting rate down. This would make it possible for municipalities to buy more lighting from their budgets.

Lighting Committee Presents Reports

The lighting committee, under C. C. Munroe, Detroit Edison Company, Detroit, chairman, was active during the year in preparing reports on various phases of the lighting business. The general report, as outlined by its chairman, summarizes the reports on the more specific subjects and presents a plan for the organization of illuminating engineering departments in central stations.

The residence lighting report was presented by its chairman, M. Luckiesh, National Lamp Works of General Electric Company, Cleveland, Ohio, whose keen humor drove home his points with stinging and lasting effect. With the data available from the primers returned in the Home Lighting Contest it was possible to expand the survey begun three years ago and to discover what is an average home. From these data a conservative ideal home was established and a conclusion reached as to what revenue might be available if all homes in the country not now equal in lighting facilities were brought up to the standard set in this conservative ideal. The astounding total in revenue at 10c per kw-hr. reached $875,000,000.

P. B. Zimmerman, National Lamp Works of General Electric Company, Cleveland, Ohio, next presented the report on lighting campaigns. In this report all the possible campaigns in the lighting field were discussed with some of the inherent difficulties in campaigns brought out from recording the reactions of central stations which had engaged in these campaigns. Mention was made of the new utility light for the home, a combination of metal reflector and opal glass shade with a plug and loop so that it may be suspended in any part of the room. Campaigns on this unit have been tried in Cleveland and seem to promise good results when the details have been worked out.

At the completion of the regular program, Clark Baker, National Mazda Sales Division of General Electric Company, Oakland, Calif., was called upon to tell of the lighting schools conducted in California last year. With the aid of slides he showed the scope and application of the two schools conducted, and brought out that these schools were primarily for contractors' estimators and jobbers' salesmen. He said that only the most elementary phases of illumination were taught and that those attending had been loud in their praise of the general idea of the schools, namely, to put information into the hands of these important links in the chain leading from design to completion of a lighting job so that better and more complete jobs would be turned out.

During the third commercial session, Miss Julia Groo, winner of the National Home Lighting Contest, was introduced and spoke briefly, outlining the progress of artificial lighting and stressing the necessity of educating homemakers to the possibilities of more decorative and utilitarian lighting.

TECHNICAL SESSIONS

Nationally speaking, the progress made during the past year in matters technical is noteworthy, and due credit must be given to H. P. Liversidge, of the Philadelphia Electric Company, and his staff, of which Western men have been a well recognized part. The willingness of the Western section to assume its full share of the burdens of the national section has had a wide influence toward the decentralization of Technical Section activities. The work performed during the past year will represent a substantial monetary saving to the various power companies which participated in the work of sending delegates to the national meeting in Cleveland and in St. Louis. Greater efficiencies in design and in operation will be noted as a result of the year's activities. Greater cooperation on the part of the manufacturers toward the simplification and the standardization of electrical apparatus has been effected, and the greatest obstacle in the pathway of this worthy aim now is the inertia of certain power companies and their officials who highly overestimate the minor and short-lived inconveniences that might in certain cases come of rigid standardization.

H. P. LIVERSIDGE
Chairman, Technical Section

First Technical Session

Technical men to the number of 500 or 600 from all over the country featured the opening meeting of the technical sessions. H. P. Liversidge, of the Philadelphia Electric Company, national chairman, opened the meeting with a brief address in which he touched upon the work of the section and the necessity of full cooperation between all geographical divisions if the greatest possible benefit is to be derived. Appreciation of the splendid support and cooperation of these divisions during the past year was expressed. The chairman stressed the vital importance of the economic aspects of all engineering

considerations. The outlook for the coming year is interesting and much good work is scheduled to be done.

Accident prevention activities slowly are coming into the recognition which they so well merit. The twelfth annual report covering these activities was submitted by the national chairman and showed the progress being made. The fact that accident prevention is clearly an essential factor in public relations was stressed. The committee has made a detailed study built around each of the several main and outstanding central station activities in order that its findings and recommendations might be applied more readily and directly. The committee recommends, among other things, that current accident reports of operating companies frequently be scrutinized in order to determine the cause and responsibility for the accidents which occur. Violation of common safety rules by new employees make it at once apparent that the education of this class of employees is of the most importance.

Highlights covering the activities of the electrical apparatus committee were reviewed briefly. Serial reports dealing with certain specific problems are in the course of preparation and others are under consideration. Generating stations, a.c. substations, d.c. substations, transformers, motors, oil-circuit breakers and protective equipment, foreign practice, hazards and safety, power factor improvement, system connection schemes, operating methods and routine and facilities, and specifications are the subjects covered during the past year.

Full cooperation with the geographic divisions has been the central theme of the hydraulic power committee in carrying out its work for the past year. Serial reports have reduced materially the congestion heretofore experienced in the abandoned practice of printing all reports as convention reports. Results of the year's work are very encouraging. Efforts are being made to obtain foreign manufacturing and operating information for the benefit of section members. Work of this committee has been restricted somewhat due to the fact that practically all work had to be carried on by correspondence, the members being so far apart. Only two meetings, the St. Louis and the Cleveland meetings, could be taken advantage of by the committee as a whole.

Interim reports on "Allocation of Costs," "Interference with Reception of Radio Broadcast Programs," and "Noise Measurement with Noise-Measuring Set" have been prepared by the inductive coordination committee. None of these reports have been published as yet, but have been submitted to the national technical executive committee for approval.

The eighteenth year of meter committee work has come to a close and finds twenty-two standing subcommittees actively engaged in the work of the committee. Seven serial reports are in the course of preparation. More than eleven thousand copies of the metermen's handbook have been sold. Twenty-five or more metermen's instruction courses are contemplated for the year. Great strides have been accomplished toward the much-desired standardization, and due thanks are given by the chairman to all who participated so liberally.

Distillation products of coal, fuel, specifications, cooperation with other engineering societies, and broad-scope problems are the subjects which have engaged the prime movers' committee for the year just closed.

One of those to go through the greatest change in organization during the past year is the overhead systems committee, which heretofore had its many subcommittees under the chairmanship of members-at-large and now divides them between these members and the various geographical division committees of the same name. Many different problems ranging from electrical problems of distribution and 220-kv. transmissions to tree-trimming and transformer loadings have been dealt with. Unfinished work in general and study pertaining to standardization of insulator threads for 1⅜-in. pins and to specifications for distribution transformers and lightning arresters are bequeathed to the incoming committee for the next year's work.

Cables for transmission of power at voltages in keeping with the demands of the industry were the outstanding subject under consideration by the underground systems committee. This subject is quite likely to engage the full energies of the committee for some time to come as it is undoubtedly of inestimable importance to the industry. Many different detailed investigations into problems of operation, maintenance and installation of cables have been made. Sincere and hearty cooperation of all geographic divisions is recognized.

Second Technical Session

Whether the much-wanted and widely discussed age of water power has not come about quietly and unobstrusively while plans for it have been talked about, was the question raised by H. A. Barre, Southern California Edison Company, in addressing the Technical Section.

Mr. Barre gave some intensely interesting information concerning "Some Factors Affecting the Relations of Steam and Water Power in Combined Systems." Whether additional generating capacity shall be provided by the construction of steam or of hydro plants is decided only after careful study of past conditions and forecast of future demands. When power is needed urgently no particular thought is given to the cost of development, the most important thing being to get the power in the quickest way. However, for all normal times, the economic aspects are of prime importance.

A company undergoing the rapid growth experienced by California utilities in particular is confronted with many unusual responsibilities. To be in a position to supply power when and where the demand may arise necessitates extremely careful studies and forecasts covering at least tentative building programs as far as ten years in advance. Steam serves particularly well for the load-building period, during which hydroelectric capacity is being developed to care for that load. The combined system must be designed to care economically for fluc-

tuating fuel costs and fluctuating hydro conditions where water available in any year may vary from a minimum of 54 per cent of normal to 125 per cent of normal.

Impulse-Wheel Design

Latest developments in impulse-wheel design were completely discussed by E. C. Hutchinson, Pelton Water Wheel Company, who pointed out the fact that California is second only to New York in point of total hydro development. The eleven western states contain 71 per cent of the total potential hydroelectric power in the United States.

Mr. Hutchinson went over the latest details of design of this class of equipment, familiarizing the delegates with the type of equipment typical of the West. In pointing out some of the engineering problems involved in the handling of the immense units of power incidental to high head developments, it was stated that the power that must be absorbed in suitable baffles when a unit is suddenly shut down at a certain plant, is 20,000 hp. from a stream of water of less than 7-in. diameter. Western hydroelectric generators are of smaller physical dimensions than their Eastern relatives, but they operate at a much higher velocity and have much finer clearances. The use of rubber seal rings is becoming more successful with each successive installation and much is hoped for the future along this line.

Co-ordinated Service

Deploring the decision of a certain public utilities commission, which did not grant permission to an electric service company to erect its transmission lines along a certain eight miles of improved highway, forcing it to go to a less frequented road, thereby reducing the possible utility of the lines to the local community, Carl Jackson, N.E.L.A. attorney, urged cooperative efforts toward the solution of the interference problem. Rural development in particular and the public good in general are greatly jeopardized by the legal squabbling between the communication and the power interests over priority of right-of-way and other allied questions.

Dual occupation of the same highway is thoroughly practical and a vital necessity in many cases. Each company must take the steps necessary to safeguard its own service and at the same time to protect its neighbor, said Mr. Jackson. The joint committee of the N.E.L.A. and the Bell Telephone Company is working along the lines of maximum public service in the most economical way and hopes to effect complete co-ordination between the interests involved. The work of the California Railroad Commission in effecting a complete cooperative solution of the entire problem is commended highly.

New Director of Engineering

Col. William Kelly, new director of engineering for the N.E.L.A., asserted that his job was not primarily that of an engineering authority or specialist, but that his biggest task was to co-ordinate the efforts and activities of some 500 committees and subcommittees. Stating that the inertia of his new task is high, Col. Kelly made a plea of tolerance and cooperation.

Col. Kelly further stated that if the engineering problems of the industry were to be settled to the satisfaction of the industry, they must be settled by the engineers of the industry. He offered himself and his office to the aggressive furtherance of this work.

Third Technical Session

In commenting upon "The Spirit which Permeates the Service of Our Utilities," H. Birchard Taylor, vice-president of William Cramp & Sons Ship & Engine Building Company of Philadelphia, stated that a cultural education of the rising generation is no longer sufficient. Explaining that "cultural" popu-

The N.E.L.A. convention brought to San Francisco many men whose names are well known to the electrical fraternity. Among them, shown here in characteristic attitudes, were (left to right)——H. G. Seaver, president, Servel Corporation, New York City; H. H. Rudd, vice-president Railway & Industrial Engineering Company, Greensburgh, Pa.; John F. Gilchrist, vice-president, Commonwealth Edison Company, Chicago, Ill.; Carl E. Jackson, attorney, N.E.L.A.; and S. Z. Michell, president Electric Bond & Share Company, New York City.

larly is taken to pertain to subjects no longer constructively alive and active, he went on to say that a revision of studies to include as requisites and fundamental sciences, business practices, fundamental economics and other allied subjects would be of inestimably more value and actual use in later life to the average student than would an accurate conjugation of some forgotten Latin verb. The present-day development is entirely too rapid to be adequately picked up and understood by the student when treated as a side line as it too frequently is. A more logical viewpoint and far sounder thinking in terms of present-day problems would result and would react to the benefit of individual and nation alike. An interest in subjects generally taken entirely for granted and which vitally enter into the life of everyone would be engendered by a study of simple and fundamental science on a more general plane than now in vogue.

Free interchange of information among those engaged in the light and power business must be unrestricted and unopposed if the greatest and most economical advances are to be made in the industry, according to Mr. Taylor, who deplores the continuance of the ancient idea that valuable information was to be regarded as a secret among a few. With the possible exception of a fractional percentage of items relating to certain manufacturing processes, Mr. Taylor admits no possible reason for the hoarding of information. The spread of information and the wide discussion of operating difficulties makes possible the most efficient and logical use of apparatus and ideas.

Just as a purely general education forestalls and prevents a proper and popular understanding of common engineering problems and difficulties, so does a lack of design and manufacturing problems and difficulties on the part of the electrical utilities prevent their proper understanding and consideration of these items in the design and operation of their systems. Mr. Taylor lays the fault at the door of the manufacturers and the competitive system as it now exists and has existed.

Status of Engineer

"The Status of the Engineer" was discussed by R. F. Pack, vice-president of the N.E.L.A., who stated that his remarks were from observation and not from engineering experience. The works of the engineer are everywhere and every day at hand, and hence the engineer need only to give consideration and study to problems of civic and community necessity along lines other than technical to achieve the recognition which is deserved. In pointing to eminent executives who are engineers, Mr. Pack emphasized the fact that the old engineering attitude that engineers had no interest in the economic features of development projects was and is nothing short of suicidal for the engineer as far his chances for advancement to executive positions is concerned. The engineer has a place in commercial activities, managerial problems, civic and political problems and other allied subjects, if only he will awake to the fact. Mr. Pack believes that more and more is the engineering profession being looked to in the hunt for capable executives.

Engineer in Human Affairs

Prof. William F. Durand, Stanford University, president of the American Society of Mechanical Engineers, also believes that the engineer has a very definite place in the sun of human affairs. Prof. Durand pictured the engineer as the guardian of all natural resources and charged him with the development of these to the end that the greatest good possible should come to the greatest number of people. The present stage of development in human affairs has come about through the harnessing of natural resources in a way which makes their energies available to mankind. Without power, Prof. Durand sees the present age as nothing more than another Roman, Greek or Egyptian age, and regardless of the glories and achievements of those ages they would not satisfy the needs of the present.

No profession has a more ancient lineage nor a greater right to be proud and to assert itself in the everyday affairs of man than has the engineering profession, the works of which have stood out since history began to be recorded, and probably before. Like Mr. Pack, Prof. Durand sees in the medieval ideas of secretiveness the stifling of progress and the loss to the world, of the future at least, of many valuable works and developments.

As custodian of all of the natural resources of the world Prof. Durand asserts that the engineer must study all of the significant factors of the present business and economic world, place a correct valuation upon each of these factors, study the reaction and action between each of the factors, and from all of these draw his conclusions. Engineering methods should be applied more liberally and generally to public problems, and no one is more the one to do this than is the engineer if only he will realize the present necessity and act in accordance with that necessity.

ACCOUNTING SESSIONS

First Accounting Session

The first session of the Accounting National Section was held June 16, at 2:30 p.m. The session was presided over by the chairman, W. Paxton Little, treasurer, of the Niagara Falls Power Company, Niagara Falls, N. Y.

W. PAXTON LITTLE
Chairman, Accounting Section

As his report on the general activities of the Accounting National Section was presented to the convention at the general session held in the morning, he did not repeat it. He stated that a great deal had been accomplished during the year just closing and that a foundation had been laid for greater achievements by their successors. Mr. Little stated that the reports of the various subcommittees had been printed and

distributed well in advance of the meeting, so would assume that they had been read and digested by those present. He accordingly instructed the chairmen to present only the salient features of their reports so that time might be allowed for discussion.

Committee Reports

The report of the budget committee was presented by Robert B. Grove, chairman, the United Electric Light & Power Company, New York City. The report consisted of a symposium of current budget practices of fifteen member companies.

In the absence of W. J. Meyers, chairman of the committee on classification of accounts and annual reports, this report was presented by Frank W. Smith, former president of the Association.

In the absence of W. H. Cassell, chairman of the committee on customers' records and billing methods, this report was dispensed with and accepted as printed.

Franklyn Heydecke, Public Service Electric & Gas Company, Newark, N. J., chairman of the filing and preservation of records committee, presented the report of that committee.

J. A. Rockwood, Portland Electric Power Company, Portland, Ore., presented the report of the fixed capital records committee in the absence of G. U. Stewart, chairman.

The report of the payroll standardization committee was presented by W. J. Vega, the New York Edison Company, New York City, chairman.

Fred W. Herbert, National Electric Light Association, presented the report of the purchasing and storeroom accounting committee, in the absence of K. C. Campbell, chairman.

The report of the securities accounting committee was given by T. A. Wallace, Henry L. Doherty & Company, New York City, chairman.

Following these reports general discussion was invited by those present. The chairman also called on a number of men from various parts of the country for an expression of their opinions.

Second Accounting Session

The second session of the Accounting National Section was held Wednesday. It was well attended and those present had the pleasure of listening to a very interesting program. The chairman, W. Paxton Little, treasurer of the Niagara Falls Power Company, Nagara Falls, N. Y., presided.

Multiple Taxation

The first address of the day was presented by Charles C. Staehling, associate professor accounting, department of economics, University of California, Berkeley, Calif., on the subject of multiple taxation. In summarizing his address Mr. Staehling stated that tax procedure should be revised wherever necessary to avoid double taxation and to use as a basis of assessment a fair measure of the ability to pay; this is generally considered to be net income. All taxation in a class should be treated with uniformity and equality. The principle of uniformity and equality in the application of ability to pay should be extended to the federal tax procedure.

Accountant Indispensable

P. S. Arkwright, vice-president of the National Electric Light Association, Atlanta, Ga., followed Mr. Staehling. He stated in his own organization he had made a detailed study of every department of the business, and while each one was essential, he had come to the conclusion that the accounting department was the most important and essential one. Although this department is seldom in the limelight, it is fundamental in the business.

Section Relationships

The relation of the Public Relations Section with that of the Accounting Section was told by M. S. Sloan, chairman of the Public Relations National Section, N.E.L.A., Brooklyn, N. Y. He stated that the accountants must create and maintain public good will by decreasing the amount of red tape in the operation of the companies and maintain it by eliminating any errors in billing customers.

W. R. Putnam, chairman of the Commercial National Section, N.E.L.A., Boise, Idaho, told of the relationship which should exist between the Commercial Section and the Accounting Section. He stated one of the largest problems facing the utilities today was that of selling five billion dollars' worth of appliances so the homes in the United States would be properly applianced. Mr. Putnam said the Accounting Section could perform a great service in working out ways and means of financing the companies or other agencies to sell these appliances and also in evolving a plan of handling the deferred payments on them. He urged the cooperation of the accounting departments with the commercial men who do not understand the problem of the accountant.

In addressing the meeting on the relationship of the engineer and the accountant, H. P. Liversidge, chairman of the Technical National Section, N.E.L.A., Philadelphia, stated that the business supplies a necessary commodity which is made possible by the use of capital utilized by the engineer and converted by him into physical properties and electrical energy. He said the engineer must have records which he can understand and that the engineer must realize the major part played by such records supplied by the accounting department. He urged closer cooperation between the two sections in their future activities.

Rate Cases

H. M. Brundage, vice-president, The Empire State Gas and Electric Association, New York, addressed the meeting on the accountant's relation to rate cases. He stated that rate cases before utility commissions and federal courts were entirely different, and that while rather informal procedure might sometimes be used in the former case, this is entirely untrue in the cases before federal courts. He said that companies should be forearmed for rate cases before federal courts, as they were always a gruelling struggle and frequently extended over long periods of time. Some of the more important points stressed by Mr. Brundage were soundness, thoroughness and completeness of the accounting methods and routine. He stated the burden of proof in recent years had rested primarily on the shoulders of the accountant.

He said the status of the accountant had been raised rapidly. After his address Chairman Little expressed the belief that this paper was the most valuable contribution that had been made to the Accounting National Section of the National Electric Light Association. It was the sense of the meeting that the paper was of such importance that it should be printed and distributed to all member companies.

Joint Committee Urged

The report of the expansion and scope committee was presented by H. M. Edwards, New York Edison Company, New York. In it the committee urged that subjects having more than section interest be handled by joint committees of the sections concerned instead of a general committee. The entire report was accepted.

Chairman Little read a resolution prepared by the executive committee of the secton, which urged the establishment of a Director of Accounting of the National Electric Light Association at the national headquarters, who would deal exclusively with accounting problems. The resolution was unanimously adopted.

CONVENTION ENTERTAINMENT

Entertainment features, planned for those few hours when there were no business sessions, filled the rest of the time for the convention delegates. The first entertainment provided for the visitors was a luncheon given by the San Francisco Electrical Development League on Monday. At this meeting nationally known leaders of the electrical industry presented concise remarks concerning conditions with which they were particularly conversant.

The president's reception, held Monday evening at the Fairmont Hotel, attracted nearly two thousand delegates who were welcomed by a receiving line headed by President Franklin T. Griffith, Mrs. Griffith, Miss Harriet Griffith, J. E. Davidson, R. F. Pack and Mrs. Pack; H. T. Sands, Mrs. Sands and their daughter, Miss Helene M. Sands; P. S. Arkwright and Mrs. Arkwright; W. A. Jones and Mrs. Jones; W. E. Creed and Mrs. Creed; Frank A. Leach, Jr., and Mrs. Leach; M. H. Aylesworth and A. Jackson Marshall. After the reception the formal ball was held in the Gold Room.

Four hundred women attended the tea given by the Women's Committee, Public Relations National Section, at the St. Francis Hotel on Monday afternoon. Miss R. E. McKee, chairman of the committee, presided at the meeting which was addressed by President Franklin T. Griffith, Martin J. Insull, chairman of the Public Policy Committee; and M. S. Sloan, chairman of the Public Relations National Section. All of the speakers complimented the women upon their work and recommended the continuance of their efforts to inform the women of the country concerning the activities of the electrical industry.

On Tuesday afternoon over three hundred women took advantage of the opportunity to visit San Francisco's Chinatown. The visiting ladies were shown the principal points of interest, tea being served at one of the Chinese cafes. Itinerant orchestras and groups of entertainers were a feature of Tuesday evening's program, which provided for private dinner parties at many of the hotels and cafes.

Prizes of an attractive nature, as well as individual favors, featured the bridge tea given the women delegates on Wednesday afternoon at the Hotel Whitcomb. Over three hundred were in attendance.

Gala Night

Thursday brought forth a variety of entertainment features starting with an automobile tour of the city in the morning and afternoon and concluding with the Gala Night program in the Exposition Auditorium in the evening. Approximately four hundred women enjoyed the automobile trip, which included a luncheon at the Cliff House. A diversified program including a tug-of-war, musical numbers and special entertainment was presented to over four thousand men and women who attended Gala Night. Following the entertainment program, the floor of the main auditorium was cleared for informal dancing.

A boat ride on one of the electrically driven ferries of the Key System Transit Company was enjoyed by about five hundred people on Friday afternoon. The vessel made a comprehensive circuit of San Francisco Bay, giving the visitors an idea of the extensiveness of the natural harbor.

Golf, due to the intensive interest in the business sessions, was neglected during most of the week. On Saturday and Sunday prior to the opening of the convention groups of delegates assembled at nine country clubs where guests' privileges had been secured for them. Following the closing of the convention, these same clubs were hosts to numerous parties.

To Harness Small Streams

The potential power in the small streams so often found in the hills and lower mountains will be made available to the farmer or other user of small units of power through the advent of a small lighting and power outfit manufactured by the Rodney Hunt Machine Company of Orange, Mass. This machine will develop sufficient power from a head of only ten feet to supply the ordinary farm, including the usual outbuildings, water pump, household appliances and a small power motor.

The generator outfit is of the turbine type, and the generator itself is arranged to charge a set of storage batteries of 88-ampere-hour capacity, eight-hour rating. The battery serves as a reservoir for reserve power and also to keep the voltage constant. Operation is planned to be such that when the batteries are charged fully and there is no power demand the generator may be switched onto a set of resistances to prevent burning out the generator. This resistance may be in the form of a water heater if so desired, or the energy may be wasted through a water rheostat.

The automatic operation is the feature of this outfit. This is accomplished by means of switchboard control which makes it unnecessary to visit the plant more than twice a month.

Hetch Hetchy Hydroelectric Development of the City of San Francisco

By P. J. Ost

Electrical Engineer, City of San Francisco

ONE of the latest additions to the ever-growing number of hydroelectric power houses on the Pacific Coast is the 80,000-kva. Moccasin plant of the city of San Francisco. This plant is the first of a string of plants projected to be operated by the supply of water that will flow from the Hetch Hetchy reservoir, in the Yosemite National Park, to the mains of the city of San Francisco. Many novel features have been incorporated into the project which, as a whole, represents the very latest in hydroelectric engineering.

IN 1910 the city of San Francisco voted a bond issue of $45,000,000 for the purpose of securing an adequate water supply for the city from the Sierra Nevada, utilizing the Hetch Hetchy Valley in the Yosemite National Park as one of its main storage reservoirs. The reservoir, which is the lowest in elevation of the main reservoir sites, is 3,720 ft. above sea level, while the city of San Francisco is at an elevation of from 0 to 300 ft. Allowing sufficient head to cause the water to flow by gravity from the reservoir to San Francisco, a distance of 170 miles, there still is available approximately 2,800 ft. of fall which may be utilized to develop electrical energy.

While it was necessary to proceed immediately to develop the water in order to hold the grant given to the city of San Francisco by Congress in 1914, it is not necessary that this water be delivered in San Francisco before 1930 or 1932. The development of the water storage and aqueduct facilities in the mountains involved the expenditure of a great deal of money from which no immediate revenue could be derived except through the development and utilization of the power. As a means of carrying the interest on the money expended in developing the water sources, M. M. O'Shaughnessy, city engineer, in charge of the project, recommended the construction of one of the power plants, which would fit in best with the water development and offer possibilities of the greatest revenue with the least additional expenditure.

The plant selected as the first development is located in the foothills at an elevation of 926 ft. above sea level on Moccasin Creek in Tuolumne County, Calif. Immediately above it is a sharp rise to a plateau stretching back to the base of the Sierra Nevada range. The elevation of this plateau varies from 2,500 to 5,000 ft. This plant is known as the Moccasin Plant, and is the lowest of a series of plants to be located along the Tuolumne River, which is the stream being developed for water supply. Two other major plants will be constructed later to take advantage of the difference in elevation between the main storage reservoirs and the forebay above the Moccasin plant.

The original $45,000,000 bond issue, based on 1910 prices for material and labor, has been sufficient for the completion of the mountain division of the water supply project, the Moccasin power plant, the transmission line from the power house 98½ miles to San Francisco Bay and the bay crossing division of the main aqueduct.

The city of San Francisco already has been offered $2,000,000 annually for the power delivered at the end of the present transmission line. This is equivalent to five per cent of the total investment outside of the bay crossing division, interest on which is being carried by the local water company. The receipt of this revenue will reduce materially the tax rate in San Francisco by removing the necessity for collecting money to pay the interest on the water bonds.

The forebay of the Moccasin plant will be the Priest Reservoir. This forebay has a capacity of 2,600 acre-ft. or over two days' flow of the aqueduct tunnel. The static head on the nozzles of the water wheels is 1,316 ft., and the effective head at full load is 1,250 ft.

Generating equipment consists of four 20,000-kva., 257-r.p.m., 3-phase, 60-cycle, 11-kv. units supplied by the General Electric Company. Each unit is driven by a double over-hung impulse water wheel furnished by the Pelton Water Wheel Company. Each wheel is of 12,500-hp. capacity. There also is mounted on an extension of the shaft a 250-volt, 140-kw. exciter. The plant is laid out to permit the installation of two additional units when the future plants farther up the Tuolumne River are constructed. These additional units will be required in order to regulate the load for all three plants and obtain a maximum power output with a uniform delivery of water to San Francisco. No forebay storage is available where the two upper plants are to be located.

The daily flow of 400,000,000 gallons, 620 sec. ft., is sufficient to operate only three units continuously

at full load. With the ultimate installation of six units the same output can be delivered on a 50 per-cent load factor. Likewise, the present four units will deliver full output at 75 per-cent load factor.

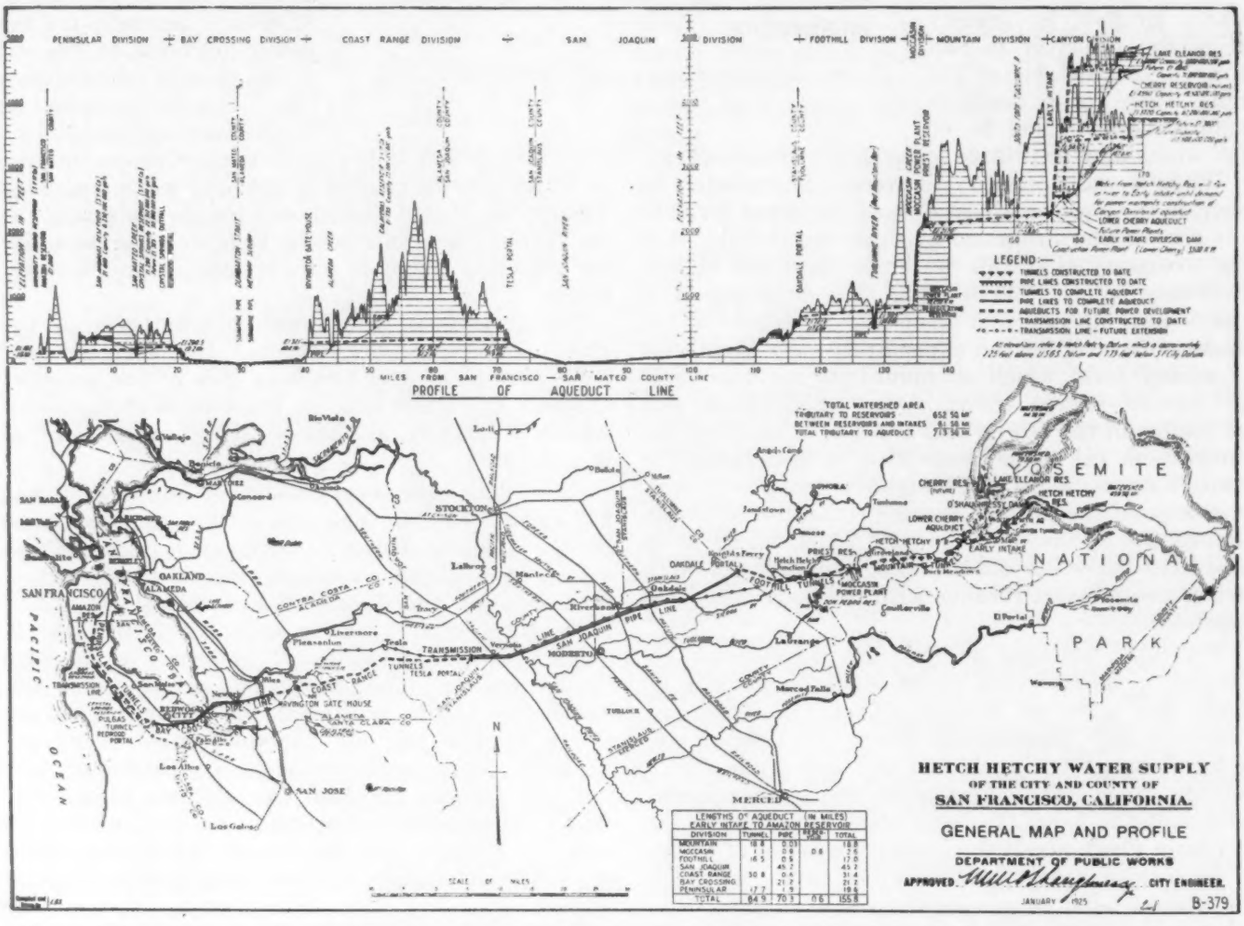
Hydraulic Development

The present capacity of the Hetch Hetchy reservoir, formed by O'Shaughnessy Dam, is 206,000 acre-ft. As future needs arise, the dam can be raised to provide additional storage of 142,000 acre-ft. In addition to the storage at Hetch Hetchy is the reservoir at Lake Eleanor at an elevation of 4,660 ft. with a present capacity of 28,000 acre-ft. Plans for the future contemplate increasing the capacity of this reservoir to 218,000 acre-ft. The watershed of the Hetch Hetchy reservoir is some 459 square miles and that of Eleanor and Cherry 183 square miles.

At Early Intake, the beginning of the aqueduct, a 262-ft. concrete-arch dam rising 55 ft. above the river bed and extending 26 ft. below to solid granite diverts from the Tuolumne River water for San Francisco's requirements. This dam is 6 ft. thick at the crest and 16 ft. thick at the base. In the 130-ft. spillway, automatic gates have been installed; their function is to hold the water level 5 ft. above the lip of the spillway during the period of low water. A siphon arrangement automatically lowers these gates to pass excess floods and allows the gates to rise again after the high waters have subsided. The headworks are equipped with suitable screens, sand traps and sluice gates. Tunnels totaling 18.8 miles in length convey the water from the intake to Priest Reservoir, which serves as the forebay for the Moccasin Plant. Approximately 11.5 miles of this tunnel are concrete-lined. The upper end, driven through solid granite, is unlined.

Priest Reservoir is formed by a dam with crest length of 1,160 ft. across Rattlesnake Creek. This dam is 147.5 ft. high and contains 717,283 cu. yd. of earth and rock fill and 17,043 cu. yd. of concrete in the core wall which extends 15 ft. into bedrock. Expansion joints divide the core wall into panels 50 ft. long by 16 ft. high. Copper water-stops totaling 27 tons of sheet copper were used in these joints. Rock for the toe of the embankment and for riprap came from the tunnel. Earth fill taken from the adjacent hills was placed partly by hydraulic methods and partly by steam shovel and dump cars, in the latter case being compacted by water.

A tunnel 5,370 ft. long and of 141.47 sq. ft. cross-section, and capacity of 1,240 sec. ft., carries the water from Priest Reservoir to the surge chamber. The surge chamber is 40 ft. in diameter, 160 ft. high and is designed to handle surges of 30 ft. with a full reservoir. All but the upper 48 ft. of the surge chamber is below ground, being 555 ft. back from the portals of the penstock tunnels.



Map showing the geographical relation between the Hetch Hetchy project and the city of San Francisco as well as the profile of the same territory

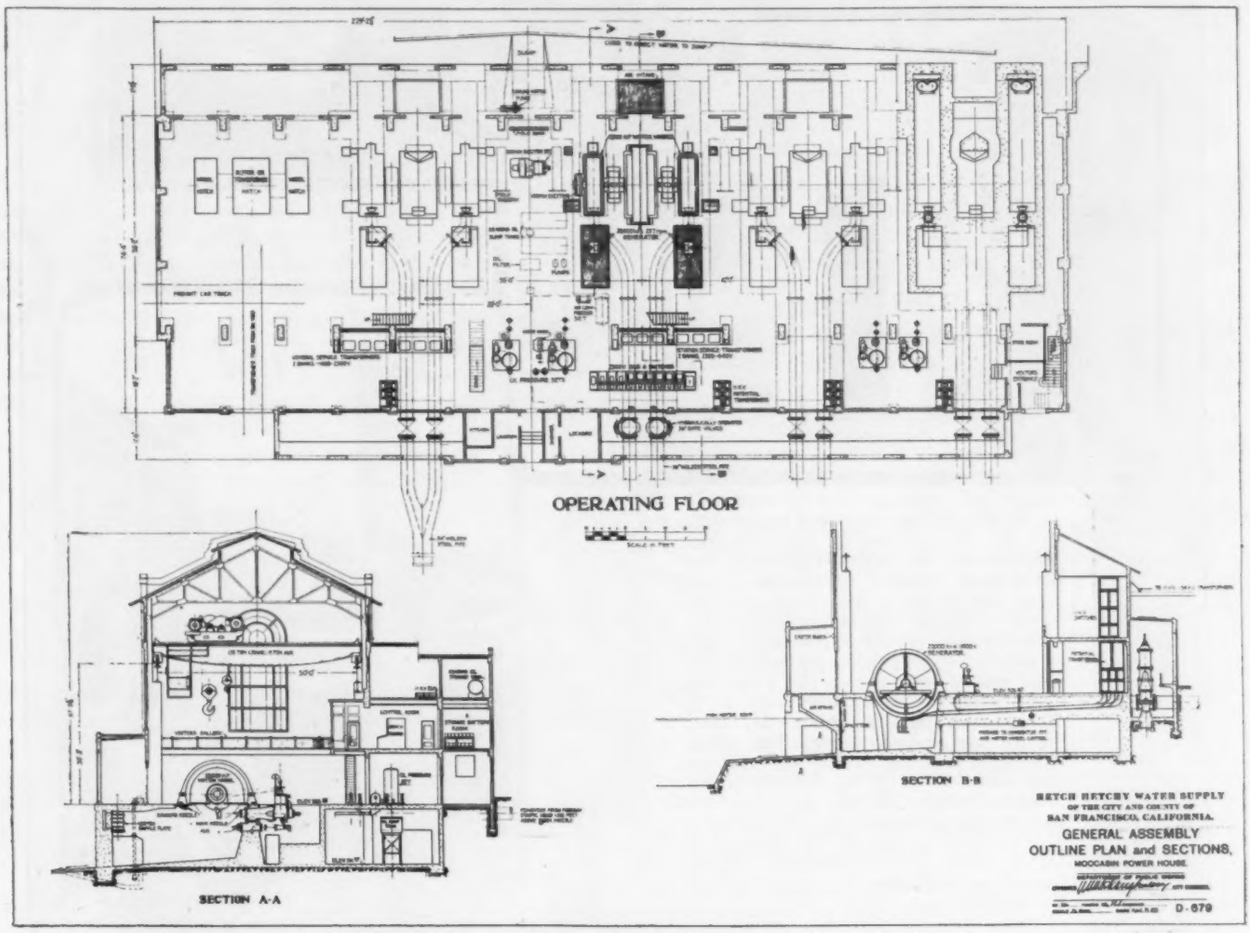
Three main penstocks, one of which is for future use, lead from the surge chamber. Each outlet is shaped like the frustrum of an oblique cone, the larger diameter of which is 12 ft. 4 in. A 104-in. riveted steel pipe connects to the smaller end of the cone and is equipped with a 104-in. butterfly valve at a point about 50 ft. outside the tunnel portal. Shortly below this point the diameter is reduced to 98 in. The butterfly valves are motor-operated and can be closed by remote control from the power house nearly a mile distant. For reasons of safety they cannot be opened by remote control. The length of each penstock is 6,025 ft., measured on the slope. At a distance of 2,111 ft. each of these pipes branches into two 66-in. pipes which continue with several further reductions in diameter on down to a point immediately outside of the power house where the diameter is 54 in. Here each of the 54-in. pipes branches into two 36-in. pipes in which are set extra-heavy, hydraulically operated, 36-in. valves. Thickness of penstock piping varies from $\frac{3}{8}$ in. at the surge chamber to 1-5/16 in. at the power house.

Building

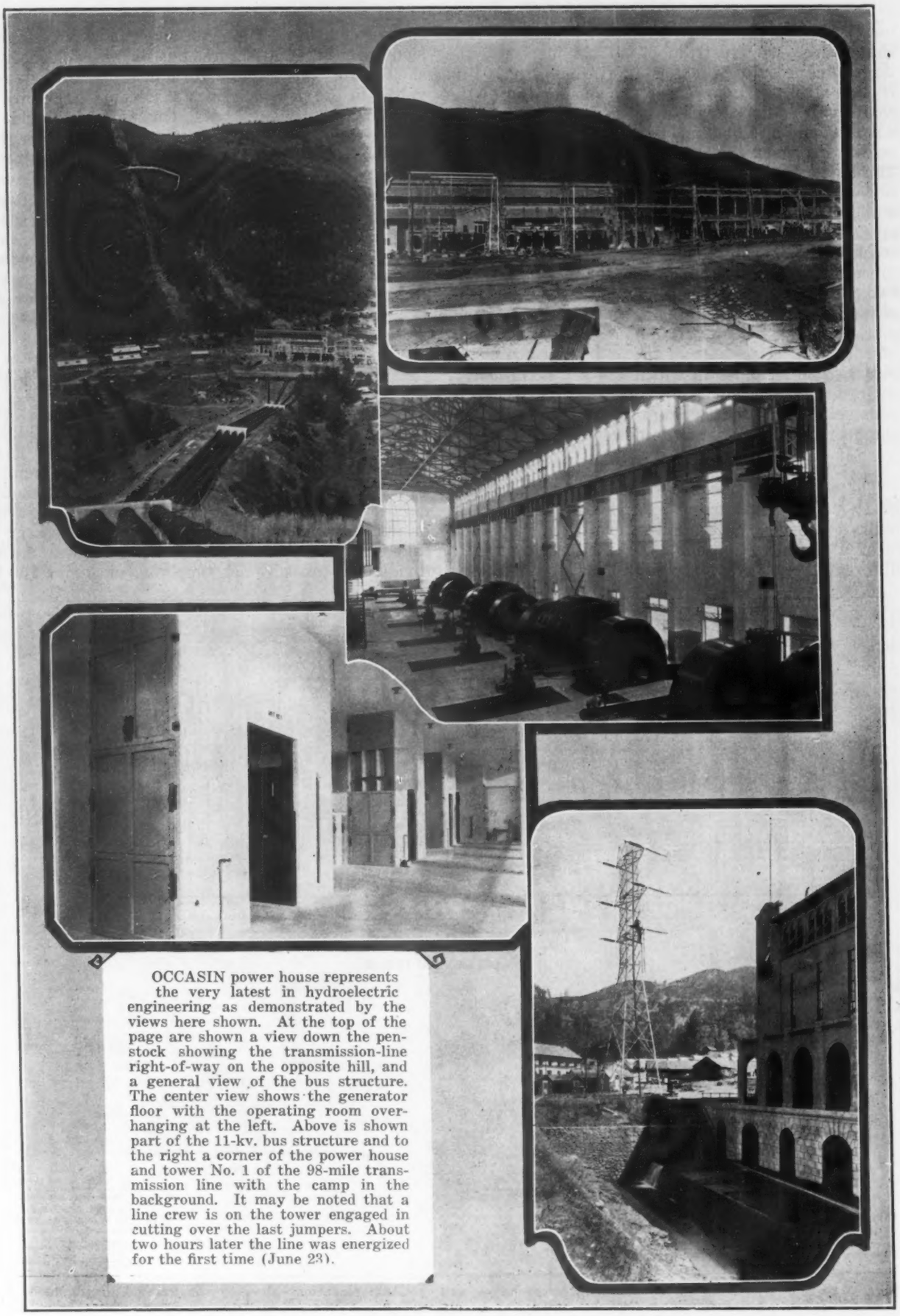
The power house is 225 ft. long, 98 ft. wide and 67 ft. high. A basement extends 15 ft. below the main floor level. The architecture of this building is of a distinctly mission type, making it entirely different from any of the high-head power houses in the state. Arcades are provided on both sides of the power house. These not only follow out the mission style of architecture, but on one side provide shelter for the 36-in. hydraulically operated gate valves in the penstock lines that control the flow of water to the needle nozzles. On the opposite side of the building the arcade has gratings in the floor that admit cooling air to the generator pits. The vortex baffle plates receiving the discharge from the auxiliary needle nozzles also are located under this arcade. This arrangement of air intake and baffle plates permitted the lowering of the power-house floor sufficiently to provide additional power more than enough to pay the interest on any slight additional cost of construction. The building has a steel frame incased in light concrete walls.

Water Wheels

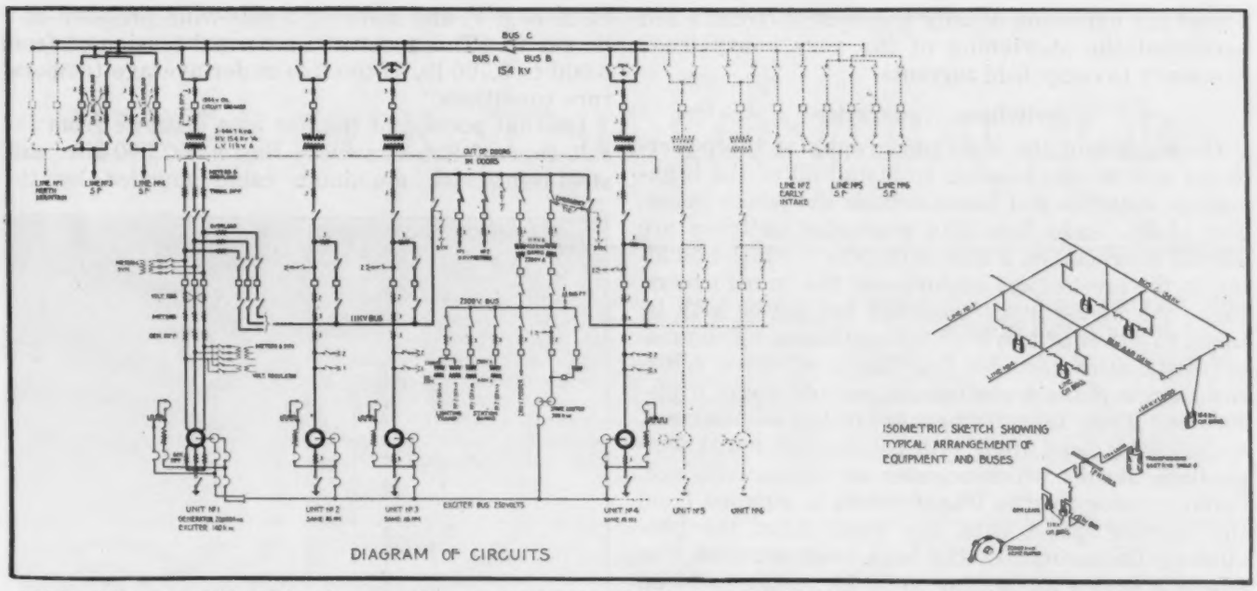
Water wheels are rated at 25,000 hp. per generator unit at maximum efficiency. They can develop 27,500 hp. at practically the same efficiency, making it possible to operate the generators at a slightly higher output when temperature conditions permit. These Pelton units are of the double-overhung, impulse-wheel type and are fitted with auxiliary relief needle nozzles which may be operated either as water saving or synchronous by-passes, as may be necessary to take care of the water-supply requirements. An individual oil-pressure set supplying oil under 150 lb.



Plan of the operating floor of the Moccasin power house, and sectional elevations showing the general arrangement of equipment



OCCASIN power house represents the very latest in hydroelectric engineering as demonstrated by the views here shown. At the top of the page are shown a view down the penstock showing the transmission-line right-of-way on the opposite hill, and a general view of the bus structure. The center view shows the generator floor with the operating room overhanging at the left. Above is shown part of the 11-kv. bus structure and to the right a corner of the power house and tower No. 1 of the 98-mile transmission line with the camp in the background. It may be noted that a line crew is on the tower engaged in cutting over the last jumpers. About two hours later the line was energized for the first time (June 23).



Wiring diagram of the Moccasin power house. At the right is shown a schematic, isometric sketch of the major electrical connections

pressure is provided with each unit to actuate the governors. Two governors are supplied with each unit, one being connected with each of the two water wheels.

Several new features lead to simplicity of operation: the speed can be raised or lowered from the switchboard; the amount of load can be limited from the switchboard; and units can be completely shut down from the switchboard. Special mechanical arrangements permit shifting from hand control to automatic control by moving only one lever. A further refinement causes both the automatic and hand-control mechanisms to be synchronized so that the throw-over may take place without any hunting action of the governor or any change in water-wheel speed. Large enameled indicators permit the operator to observe the position of the needle nozzle from the switchboard room. The pit around the governor mechanism is covered with Irving subway grating, thus making it possible to observe the action of the servomotor from the operating floor. This construction also gives direct daylight into the pit. The control mechanism and generator pit are readily accessible from the basement by a tunnel through the foundation.

Generators and Transformers

Generator rotors are mounted on the water-wheel shaft between the two wheels.

Two cast-steel flywheels machined to receive the pole pieces form the spider. The machine is inclosed in a sheet-steel housing which causes air to be taken from the pit under the generator and delivered out through the windings into the generator room. The amount of air to be handled is 60,000 cu. ft. per min. Ample outlet for the heated air is provided at the top of the generator room.

As indicative of the rate at which water wheels and generators are increasing in size, it is interesting to note that when this project first was studied units of 12,500-kva. capacity were the largest which could be purchased. However, when the time came actually to order the machines, 20,000-kva. units were readily obtainable. One unit of this capacity is sufficient for charging an unloaded transmission line, the line requiring approximately 17,000 kva. at 154 kv. The characteristics of the generators will prevent their being self-exciting when carrying this load. This makes it possible to put a single generator on a transmission line and gradually build up the voltage without fear of exceeding the desired voltage at the delivery end of the line.

Transformers furnished by Westinghouse Electric & Manufacturing Company will step the voltage to either 115 kv. or 154 kv. for transmission over the two lines running to Newark on San Francisco Bay.

Regulators and Switchboards

All machines are controlled from the switchboard located at one side of the center of the building. The design of the plant contemplates that a generator with its associated bank of transformers will be operated as a unit. Units will be connected only on the high side of the step-up transformers. This arrangement does away with a complicated system of 11-kv. switches and buses and materially simplifies the whole power-house layout. To take care of station power requirements, supply two local 11-kv. feeders and in emergency permit any generator to be connected to any bank of transformers, one 11-kv. bus has been run the full length of the power house. Normally this will be connected to but one generator at a time.

A Westinghouse broad-range type of regulator is provided for the exciter of each generator, and for a spare motor-generator exciter which has sufficient capacity to supply excitation to two generators. Field-control boards for all units have been placed on the main floor adjacent to the exciters. Field switches and field rheostats of the size employed are remotely controlled under any circumstances. The placing of these adjacent to their point of use in-

volved the extension of only the control circuits and permitted the shortening of the very heavy leads necessary to carry field currents.

Switching Apparatus

On account of the ideal topography at the power-house site, it was possible to install all of the high-voltage switches and buses outside the power house. The 11-kv. leads from the generator switches are carried overhead on a steel structure from the building to the low-voltage bushings on the transformers. From the high-voltage bushings the power may be taken to either of two high-voltage buses. The present installation includes four banks of three 6,667-kva., single-phase transformers and one spare transformer. These transformers are of the oil-insulated, water-cooled type fitted with cooling-water and temperature alarms which register on the switchboard. Cooling water for the transformers is pumped from the tailrace rather than use water from the penstocks. On account of the high head involved this effects a saving amounting to 60 kw. under full-load conditions.

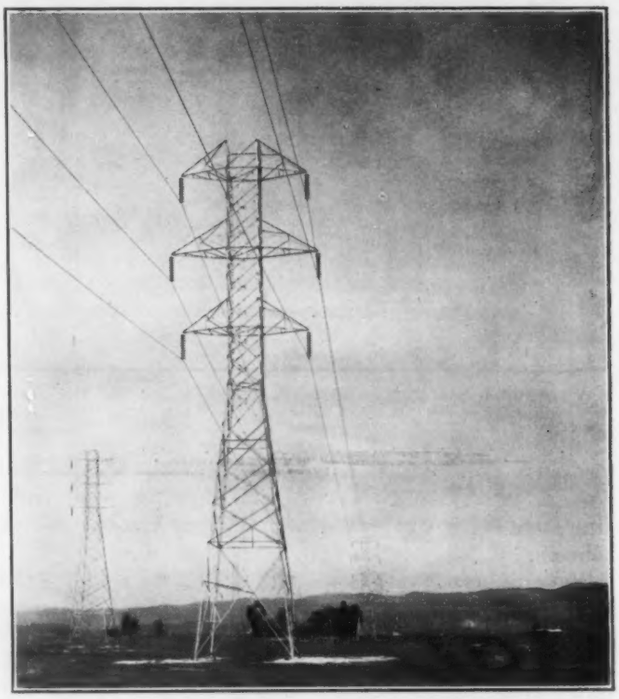
High-voltage buses connecting transformers to transmission lines are of 750,000-circ. mil stranded copper. High-voltage connections for individual units are made of standard 2½-in. wrought iron pipe. Connections for the transmission lines are made of 2½-in., extra-heavy pipe. As far as possible, high-voltage oil switches were replaced with air-break switches at an appreciable saving in cost. This necessitated a very careful arrangement of interlocks between switches. As a further precaution a complete arrangement of semaphore signals and light signals has been installed to prevent the wrong throwing of a switch by hand. All of the air-break switches, with the exception of the bus sectionalizing switch, are power-operated direct from the switchboard. A lookout window in the back of the power house permits the operator to overlook the switch yard and penstocks without getting far away from the operating room.

Transmission Lines

Two transmission lines connect to the high-voltage buses at the present time. Power from the upper plants later will be brought down over two new transmission lines into the same buses. By that time two additional transmission lines will have been constructed from Moccasin to the Bay region, thus making six lines connected to the Moccasin buses.

The present two lines are carried on five hundred and six 98-ft. steel towers over the 98½-mile stretch. The route crosses due west over the San Joaquin Valley four miles north of Modesto on the northerly side of a 190-ft. right-of-way. The lowest crossarm is 62 ft. above ground level. Conductors of each circuit are spaced 15 ft. apart vertically. The horizontal distance between the wires at the top and bottom crossarms on the tower is 24 ft. and at the middle arm 28 ft. Average spacing between towers in level country is 950 ft. while the spacing in the rougher country varies from 350 to almost 2,400 ft. No very cold weather is experienced, and the line has been strung for a maximum tension of 5,000 lb. at 20 deg. F. and allowing a side-wind pressure of 8 lb. per ft. This results in a normal tension of from 3,000 to 3,700 lb. in the line under average temperature conditions.

On that portion of the line at a distance from the salt fogs of San Francisco Bay a 397,500-circ. mil, steel-reinforced, aluminum cable supplied by the



Hetch Hetchy transmission line just east of Newark, Calif.

Aluminum Company of America has been installed. Adjacent to the bay, 9 miles of line are strung with conductors of stranded copper with hemp core having a copper cross section of 345,000 circ. mil. The physical size of this cable is that of a 425,000-circ. mil cable with the seven center strands replaced by a saturated hemp rope. This gives a conductor of ¾-in. external diameter, which is necessary in order to prevent excessive corona when operating at 154 kv. This conductor was supplied by the Anaconda Copper Mining Company.

Four types of transmission towers are used in the line. These are classified as follows: standard towers, for normal conditions of stress and spacing; heavy duty towers, for angles, points of heavy pull-downs and railroad crossings; switch towers, for accommodating air-break, line-sectionalizing switches; and transposition towers. Towers are of galvanized steel and were supplied by the Pacific Coast Steel Company.

Ten Westinghouse No. 601 insulator units are used at suspension points, while at points of greater stress 12 Westinghouse No. 631 units are used. As far as possible in the construction of the line dead ends were avoided. Where heavy loading was encountered that made it desirable to secure strength above that supplied by the standard tower, a heavy-duty tower was erected and equipped with ten No. 631 units in a string.

IDEAS FOR THE CONTRACTOR

Chico Contractors Organize and All Become Electragists

A local association of contractors was recently formed in Chico, Calif. One of the first acts of the members was to join the California Electragists, which includes membership in the Association of Electragists, International. The Association of Electragists was organized for the protecion of the public against inferior workmanship and materials, and as a fire-protection measure. The new members gladly subscribed to a pledge which obligated them to high standards of business practice that would meet the approval of the public generally and of their business competitors and associates.

Considerable publicity was obtained for the new association in an article appearing in the Chico Record which told of the formation of the new association and gave the names of its members. It also outlined some of the history and principles of the Association of Electragists, International. As a further means of advising the public of their new affiliation, the members had a 4-column 10-in. advertisement inserted in the newspaper calling attention to the necessity of having a responsible contractor do electrical work and also of having periodic inspections, in addition to announcing their membership in the Association of Electragists, International.

Tentative Electrical Safety Orders Are Approved at Public Hearings.— Public hearings were held in San Francisco May 26, and in Los Angeles June 2, on the tentative Electrical Safety Orders of the Industrial Accident Commission of California. They were approved at each of these hearings with a few minor changes. The final draft now is being prepared and will be sent to the state printer at once. It is expected that final copies will be ready for distribution about Sept. 1, 1925.

CALLING AN ELECTRICIAN

MAY SAVE CALLING THE FIRE DEPARTMENT

Faulty electrical wiring and connections are responsible for many fires in the homes; and it takes an EXPERT ELECTRICIAN to find and correct the faults.

Doctoring up your electrical equipment is like doctoring yourself. You may hit upon the right treatment — but if you don't, the results are disastrous.

Your electrical problems should be turned over to the man who thoroughly understands electricity. Your electrical wiring is safest in the hands of an EXPERIENCED ELECTRICIAN.

Better Electrical Work

REGULAR INSPECTION of wiring and equipment is an important FIRE PREVENTION measure. Calling an electrician may save calling the fire department.

What hands and feet are to a man, the electrical contractor is to the electrical industry; for his progress, the electrical contractor is indebted to leadership within his own group, and it is with pride your electrical contractors announce their membership and affiliation with the

INTERNATIONAL ASSOCIATION OF ELECTRAGISTS

We, the Chico members of the International Association of Electragists, are anxious to serve you with BETTER ELECTRICAL WORK.

Boblett Manufacturing Co. 628 Main Street

Bird Electric Co. 309 Main Street

Gas & Electric Service Co. 233 Broadway

Chico Electric Supply Co. 542 Broadway

This 4-column 10-in. advertisement was used by the members of the Chico contractors' association in announcing its affiliation with the Association of Electragists, International.

Announcing a New Service for Electrical Contractors

Realizing the need for a forum for the exchange of ideas in the electrical contracting field, particularly with reference to problems of estimating, the Journal of Electricity is publishing a series of articles on this subject by a recognized authority, the first of which appears in this issue.

J. R. Wilson, engineering department, Los Angeles Electric Works, has been secured to write this series. Mr. Wilson has been in the electrical construction industry for the past twenty-eight years. He first entered the industry in

J. R. WILSON

1897 in the construction department of the Chicago City Railway Company. He later moved to Cleveland, Ohio, where he specialized in Class-A building installations. From 1911-1914 he was city engineer for Hudson, Ohio. In 1920 he came to California with the J. G. White Engineering Corporation, superintending the electrical construction in the $3,000,000 sulphuric plant of the General Chemical Company at El Segundo, Calif. Since 1921 he has been active in the electrical construction field in Los Angeles, both in building construction and industrial plant installations. Mr. Wilson has been with the Los Angeles Electric Works since 1922. He has been an active leader in educational and organization work in the electrical industry.

It is the object of this series to discuss the problems which daily are confronting the electrical contractor, and every effort will be made to make it of practical value. The text will be supplemented with drawings and pictures wherever possible. The cooperation of our readers is invited to make this series of the greatest value to them; criticisms and suggestions will be welcomed.

Electrical Estimating for the Contractor — I

The First of a Series of Articles on This Subject by a Successful Contractor in Business at the Present Time

By J. R. WILSON*
Engineering Department, Los Angeles Electric Works

Estimating contract work of any kind may be compared to a chemical formula because it is composed of certain things that must be mixed in the proper proportions to make a finished product which will give the results desired.

The ingredients necessary to produce an estimate that will attain the desired result, a fair profit on work done, are analysis, judgment, engineering experience and practical experience. The proportions in which these are mixed will depend upon the person making up the estimate.

Analysis is the most important factor of an estimate, and the degree to which a man is able to separate a job into its component parts and to analyze each part is the real factor which determines whether a job will show a profit or loss.

Judgment is attained only through personal experience. After a piece of work has been separated into the different classifications in which it naturally belongs, a man's judgment must tell him the different "factors of grief" he probably will have to contend with should he be fortunate (or unfortunate) enough to be awarded the contract.

Engineering experience necessary to successful estimating can be determined only by the class of work a contractor intends to engage in. On small jobs on which contracts are made usually very little engineering ability is required. This assertion does not hold in the electrical and mechanical lines, however, as in those callings a very small job may require a great deal of engineering knowledge and may be very complicated. On large jobs it is essential that the contractor be competent to check the architect's or engineer's plans and specifications or to prepare such plans or specifications should the need arise. In appraisal work, which contractors very often are called upon to do, engineering knowledge is essential, especially in estimating depreciation on machinery and equipment. Some contractors with whom I am acquainted personally have a very small amount of engineering ability, and yet they are making money. It is my personal opinion that they would make much more were they not limited in their scope by their lack of technical training. I firmly believe that to be successful in any line of contract work a mixture of at least a reasonable amount of technical training and a large amount of practical experience makes the winning combination.

Practical experience in doing any particular kind of work should be the largest factor used in making up an estimate. A man who has had very little practical experience and depends upon some one else to make up his estimates on contract work always is "treading on thin ice," and the danger increases as the size of the contract increases. The amount of practical experience a man has had largely will determine his success as a contractor.

Engineering degrees and books are very well in their place but in the actual placing of the materials and the making of a finished job experience is gained that cannot be duplicated in any college or library.

Of course, a contractor who is doing a large volume of work cannot be expected to do his own estimating, any more than a "merchant prince" would do his own clerking. But so many times we see a man who has made a wonderful success as a "small time" contractor fail dismally as a "real" contractor. This may be due to several of many causes, but I believe that investigation proves that in any specific case the fault has been that the man did not use good judgment in his methods of estimating.

After graduating from the small-time class he either has attempted to continue doing his own estimating which, owing to lack of time, results in too much guessing, or else he has relegated this important duty to a $30-a-week clerk or someone else just as incompetent.

Money spent in employing a competent estimator is the very best investment that can be made in any contracting business. As far as practicable every contractor should check the estimates that are sent out under the name of his firm. This checking may be as simple or as elaborate as the contractor himself feels is necessary. Inasmuch as his money is involved in the transaction, he certainly should be interested enough to want to know where it is going. An incompetent estimator can ruin a contractor very quickly if no check system is used on his estimates.

Even on so-called "quantity surveys" each contractor is entitled to a set of plans from which to check the estimate and should demand these plans and check them before submitting his bid.

Estimating is just as much a profession as the practice of medicine or law, and the competent estimator usually has spent as many years learning his profession as has the doctor or lawyer. Therefore, a competent estimator is entitled to adequate compensation for his services. As you give so shall you receive, and no man can do his best work unless he is being well paid for his time.

This is not meant to convey that a man who calls himself an estimator should be rated immediately as a high-salaried employee. An estimator worthy of the name should be willing to submit proof as to past performance or should be willing to "try out the job" before expecting to receive the highest rate of compensation.

To the man with an analytical turn of mind electrical estimating offers one of the most fascinating and satisfying professions there are. The field of the electrical industry is so large and varied that a man may spend a lifetime in one branch of the business and become familiar only in a very slight degree with other branches of the industry. In the field of materials alone new types are being placed on the market every day, and a man constantly must study his trade journals in order to be familiar with the latest types of labor- and money-saving devices and stay in the forefront of the profession.

In analyzing a job the first requisite is to separate the work into the different classifications in which the operations will be performed. This separation will be regulated to a very large extent by the type of building. No job can be estimated intelligently unless certain fundamental data are available, and the only way to determine how much of these data is necessary is to divide the work into separate parts. Then experience will tell what information is missing from the plans and specifications.

If the necessary information is not obtained before the bid is submitted and the contract signed, the contractor may find himself let in for a great deal of additional expense which he did not contemplate. There is usually a clause in all building specifications requiring the contractor to furnish "anything needed to make a complete job—whether same be specifically mentioned in the specifications or shown on the plans." This clause might be beaten if taken to court, but usually the cost of court action is too great for a contractor to take a chance on losing the case. The safest way is to study the job thoroughly, demand the information you need, and "watch your step." The things which will cost the most money usually are those that are forgotten.

The size of the job will determine the number of parts into which the work should be separated.

On a small power job the divisions will usually work out as follows:

Service wires
Service conduit
Service switch
Service fuses
Service head
Meter loop
Service ground
Secondary ground
Motor wires
Motor conduits
Motor switches
Motor fuses
Control equipment.

A small lighting job almost always will lend itself to the following classifications:

Service wires
Service conduit
Service head
Service switch
Service fuses
Meter loop
Service ground
Secondary ground
Branch circuit cabinets
Branch circuit fuses
Branch circuit wires
Branch circuit conduits
Branch circuit switches
Branch circuit base plugs
Branch circuit floor plugs
Lighting fixture equipment
Lamps

Regardless of the size of the job, the above items will enter into it to a greater or less degree, and each item will require explicit information. Every item represents money to be spent for materials and labor, and it is essential that the exact cost be known if the job is to show a profit.

On these small jobs usually each contractor has to make his own "layout" as the owner does not feel inclined to pay an engineer to draw plans and specifications. If the job is located where adequate inspection is required, the owner probably will receive a good job, and the prices submitted will not vary to a large extent.

* All rights reserved by the author.

NEWS OF THE INDUSTRY

Pacific Gas and Electric Company Will Enter Merchandising Field

Increased sales activity calling for the addition of 150,000 hp. of connected load within the next six months and embracing the cooperation of power companies, manufacturers, jobbers, contractors and dealers throughout northern California has been announced by the Pacific Gas and Electric Company. Every current consuming factor, with the exception of lamp-socket devices, is embraced in the plans for the sales drive, some of the major items being 4,000 electric ranges and 2,000 electric water heaters.

This sales effort has been made necessary by the addition of approximately 200,000 hp. to the installed capacity of the system during the next sixty days. This increase in capacity includes 75,000 kw. from the company's Pit No. 3 plant which will be ready for operation July 18; and part of the output of the Copco No. 2 plant of The California Oregon Power Company that has been contracted for by the Pacific Gas and Electric Company. The plant will be ready for operation late in July or early in August.

The sales drive, which is in addition to sales plans for the year involving budget expenditures of $500,000, involves two major premises. In the first place the company will not sell lamp-socket devices directly. It will encourage the sale of these appliances through existing dealers. Direct sales efforts of the company, in cooperation with other branches of the industry, will be confined to the following:

1. Electric ranges.
2. Electric water heaters.
3. Electric air heaters of 1-kw. capacity and upward.
4. Lighting.
   a. Kitchen
   b. Lamp sales
   c. Commercial
   d. Signs
   e. Industrial
5. Electric trucks and electric refrigerators.
6. Industrial heating.
7. Isolated plants.

More than 200 salesmen and sales engineers will be utilized in the execution of the plans. The plans were worked out under the supervision of H. M. Crawford, sales manager of the company.

The range and water heater activities call for the installation of 4,000 ranges representing an investment of $800,000 installed and 2,000 water heaters representing an investment of $200,000 installed. The quota of the Great Western Power Company, which is working in close cooperation in the drive, is approximately half this number of ranges and water heaters. Ranges and water heaters will be sold at list prices with exceptional terms to large dealers, department stores, household furnishing goods stores and furniture stores in order to secure their cooperation. A flat fee will be charged for installation. All wiring will be done by contractors. The installation charges which are considerably cheaper than prevailing averages are:

City

	Terms	Cash
Range only	$60	$54
Range and Water Heater	80	72
Water Heater only	30	27

Country

	Terms	Cash
Range only	$40	$36
Range and Water Heater	60	54
Water Heater only	30	27

The power company will handle all contracts for installation even when the range is sold by some other agency. Competitive bids will be asked from contractors on the wiring. Terms offered to consumers on ranges and water heaters are one-tenth of the list price down and the balance in 20 months. For installation the terms are nothing down and the contract price in 20 months. All salesmen will work on a salary and commission basis. Bonuses will be paid salesmen, and standard campaign methods will be employed using contests of various sorts.

Lighting activities will center around a kitchen-lighting campaign which also will embrace the sale of lamps and color and decorative lighting for the home. Commercial lighting activities will follow the same plan employed a year ago (Journal of Electricity, Mar. 1, 1924, p. 165) with the cooperation of manufacturers, jobbers and contractors. A traveling display similar to that of the California Electrical Bureau will be taken over the territory and demonstrated to merchants. In industrial lighting a number of trained illumination salesmen will canvass all factories, survey lighting conditions and recommend improved lighting systems. In increasing sign lighting, salesmen will work in cooperation with sign manufacturers.

Electric trucks and electric refrigerators will be sold through established channels of distribution with power company men working in cooperation with manufacturers in overcoming sales resistance. Industrial heating will be sold in cooperation with the manufacturers of heating equipment. Two trained sales engineers will work on isolated plants in an endeavor to connect these loads to the lines of the central station.

A large amount of direct-mail and newspaper advertising will be employed. Work is under way at the present time in recruiting the sales force necessary to execute the drive. Classes are being held, and salesmen are being given the necessary training to equip them for the work. It is expected that the drive will be under way shortly after July 1.

As far as Western power companies are concerned this is the greatest commercial activity ever undertaken by a single company.

Contract for Hetch Hetchy Power Disposal Prepared

An ordinance providing for the temporary distribution of Hetch Hetchy power over the lines of the Pacific Gas and Electric Company was passed to print by the San Francisco Board of Supervisors on June 18 by a vote of 11 to 7. This action broke a deadlock over the price to be paid for the energy from the 80,000-kw. Moccasin power plant which is now ready for operation. Before signing the contract, which is acceptable to the utility company, city officials are endeavoring to secure the assurance of the Secretary of the Interior and the Attorney General's office that the contract is not in conflict with the requirements of the Raker Act, which granted the Hetch Hetchy project to the city.

In the negotiations for the disposal of the power the utility company offered the city the sum of $2,000,000 a year for the 400,000,000-kw-hr. estimated output, and the city countered with the demand for $2,583,000. This offer was refused by the company on the grounds that it is purchasing power from other agencies at a less rate per kilowatt-hour.

The present proposed contract provides that the utility will pay the city $2,000,000 a year for the power which is to be delivered at the company's Newark substation. The contract may be terminated by either party on one day's notice.

Following the passing of the ordinance by the Board of Supervisors the directors of the Modesto Irrigation District, which also takes water from Tuolumne River, unanimously adopted a resolution condemning the proposed contract. The action was taken on the ground that the contract violated the Raker Act in that it did not make proper provision for the requirements of the Modesto Irrigation District. Copies of the resolution of the irrigation district have been mailed to the Secretary of the Interior and the Attorney-General.

On June 29 the Boad of Supervisors finally passed the ordinance directing the Board of Public Works to sign the contract with the Pacific Gas and Electric Company. The ordinance was signed by Mayor Rolph.

Power Lines May Serve Washington District.—The construction of a transmission line by the Puget Sound Power & Light Company to serve the Newaukum Valley district, south and east of Chehalis, Wash., along the Pacific Highway, is being considered seriously.

Washington Company Sells 375 Ranges in Six Weeks

As the result of six weeks' intensive effort, electric ranges and water heaters with a total gross sales value of $80,000 were placed in service on the lines of The Washington Water Power Company recently. In addition to the sales value of the merchandise, the company has benefited to the extent of having its annual revenue increased by $30,000.

The number of electric range users was increased from 16.6 per cent of the residential consumers to 18 per cent, and the company feels the opportunity for increasing the number of ranges on its system has been bettered. During the time that the campaign was in progress a total of 375 ranges was sold, most of which were installed with an electric water heater. The company now has over 6,000 ranges on its lines.

The campaign just completed featured the Hotpoint Super-Automatic range of the Edison Electric Appliance Company, Inc., and a price was determined upon that included the range, water heater, wiring and installation. An aluminum cooker unit was offered with the range. In planning the campaign Lewis A. Lewis, sales manager, R. B. McElroy, assistant sales manager, and J. F. Farquhar, general agent, set quotas for the Spokane territory and for those outlying towns directly served by The Washington Water Power Company. The quota for Spokane was 200 and for the remainder of the territory 130. Final results showed the following:

	Spokane	Outside Towns (Served directly) (by W. W. P. Co.)	Total
Population	118,000	62,000	180,000
Residential consumers	26,363	8,550	34,913
Ranges sold—			
Super Automatic	158	69	227
Other Hotpoint	67	40	107
Other makes	19	22	41
Total sold	244	131	375
Gross sales value			$ 80,000
Average price for installation (range and water heater)			$215

The sales policy employed was much the same as that used by the company about a year ago (Journal of Electricity, Aug. 1, 1924, p. 102), the city salesmen being allowed the regular commission of 10 per cent. Special prizes were awarded each week to the three salesmen selling the greatest number of ranges. Five out of the eight city salesmen oversold their quotas, thus winning bonuses of $25 each.

Advertising in the campaign included the use of newspapers, broadsides, and in Spokane two illuminated billboards located on principal street car lines. The broadsides were mailed to all residential consumers during the first week of the campaign.

New Holding Company Is Headed by Stone & Webster

A syndicate composed of Stone & Webster, Inc., Chase Securities Corporation, Blodgett & Company, and Blair & Company has formed the Engineers Public Service Company, Inc., to acquire and operate public utility properties directly or through subsidiaries. It is announced that through its initial purchase the new company will acquire more than two-thirds of the common stock of the Virginia Railway & Power Company, Richmond, Va., and has contracted to purchase directly or through a subsidiary the entire capital stock of the Spottsylvania Power Company, Fredericksburg, Va.

The policy of the new company, as announced, is to acquire additional public-utility properties when obtainable at satisfactory terms. Several other properties are now under consideration. The company has placed on the market 200,000 shares of $7 dividend preferred stock which is being offered at $100.

Map of Great Western Power Company and San Joaquin Light & Power Corporation systems showing (dotted line) location of 220-kv. line to be constructed in near future

Great Western Power Company to Erect 220-kv. Double-Circuit Line

Application has been made to the California Railroad Commission by the Great Western Power Company of California for permission to begin construction of a double-circuit 220-kv. steel-tower transmission line which will connect its system with that of the San Joaquin Light & Power Corporation. The power line will extend from Brighton, near Sacramento, to Merced, a distance of 104 miles. The cost, including substation equipment, will be approximately $2,750,000.

Preliminary engineering work having been finished, the Great Western company now is ready to begin actual building operations. The company, in addition to applying for permission to erect the line, requested authority to exercise certain franchises granted to the company by San Joaquin, Stanislaus and Merced Counties.

It is planned to operate the power line initially at 165 kv., but it will be designed for 220 kv. Steel towers of the double-circuit type, with one circuit installed, will be erected. A radio carrier-current telephone system will be installed to follow the course of the transmission line.

The new transmission line, contemplated when the San Joaquin Light & Power Corporation was purchased by the Western Power Corporation, holding company of the Great Western company (Journal of Electricity, Dec. 1, 1924, p. 417, and Dec. 15, 1924, p. 454), will enable the two companies to interchange energy directly. The raising of the Big Meadows Dam (Journal of Electricity, April 15, 1925, p. 295), also is part of the development program undertaken by the Great Western company to provide additional capacity.

Great Western to Take Output of Buck's Creek Plant

Contracts for the output of the Buck's Creek plant of the Feather River Power Company have been signed with the Great Western Power Company. The purchasing company will take delivery at the power house, the current to be metered on the secondary side of the transformers.

The Buck's Creek plant, to be located on the Feather River in northeastern California, will have an installed capacity of 60,000 hp. and will operate under a head of 2,580 ft., according to Lars Jorgensen, head of the engineering department of the company. No definite date has been given for the starting of construction on the plant, which is to be the first development of a series of seven, with a total ultimate capacity of 415,000 ft., contemplated by the Feather River company. (Journal of Electricity, May 1, 1925, p. 334)

Permit for Elwha River Site Is Given Washington Utility

Permit to appropriate 600 sec. ft. of water from the Elwha River in Clallam County, Wash., for hydroelectric power development, has been granted the Northwestern Power & Light Company of Port Angeles by R. K. Tiffany, Washington supervisor of hydraulics. It is estimated that 10,227 hp. can be developed, using the water under a 150-ft. head. The company also was granted permission to construct a reservoir to store 15,000 acre-ft. of water. The project will cost approximately $800,000.

The concrete diversion dam for the power project is to be approximately 160 ft. high, with a length of 400 ft. on top. The penstocks are to be one-tenth of a mile long, of steel construction, and are to be approximately 10 ft. in diameter throughout. The impounding dam for the storage reservoir will be of the same dimensions as the diversion dam.

Power is to be developed by a vertical reaction turbine connected direct to an a.c. generator. Construction on the development, which is known as the Glines Canyon project, is to begin by Aug. 1, 1925, and is to be completed by Dec. 31, 1926.

Electric Home Is Displayed by Seattle Electric Club

The official opening of the electric home in Winona Park, Seattle, built in connection with the "Own Your Own Home Exposition" under the auspices of the Electric Club of Seattle and the Seattle Real Estate Board, occurred on June 10. The home was given away on June 22, the closing night of the exposition to the holder if the winning admission ticket.

The home, a modern five-room bungalow, represents an outlay of $7.500.

A. J. Lutz of the Pacific States Electric Company was chairman of the Seattle Electric Club's committees, and Harry Byrne, of the North Coast Electric Company, was vice-chairman. The various chairmen and committeemen were:

Executive Committee—J. D. Ross, City of Seattle; J. J. Hayes, Westinghouse Electric & Manufacturing Company; W. M. Meacham, Meacham & Babcock; S. G. Hepler, Arrow Electric Company; L. R. Grant, Puget Sound Power & Light Company.

Finance Committee—J. J. Hayes, chairman; Harry J. Martin, National Carbon Company; George Reiniger, Globe Electric Company; Grover Burke, City Electric & Fixture Company; J. H. Kelly, Western Electric Company.

Advertising Committee—L. R. Grant, chairman; A. E. Williams, City of Seattle, Light Department; J. R. Murphy, General Electric Company; Paul Miller, Westinghouse Electric & Manufacturing Company.

House Wiring Committee—W. M. Meacham, chairman; C. G. Zokelt, Northwest Engineering Company; C. B. Campbell, 516 Seneca Street; J. J. Agutter, J. J. Agutter Company.

Appliance Committee—J. H. Kelly, chairman; Roy Constable, Forbes Supply Company; Fred Block, Pacific States Electric Company; L. S. Rubles, North Coast Electric Company; D. U. Chamberlain, Globe Electric Company.

Exposition Committee—Joe Wells, chairman; W. E. Jones, Economy Fuse Manufacturing Company; Harry Byrne, North Coast Electric Company; S. Sinex, Puget Sound Power & Light Company.

Suit to Prevent Diversion of Merced River Filed

Suit to enjoin the Merced Irrigation District from proceeding with the construction of the Exchequer Dam and the diversion of water from the Merced River has been filed in the Merced County Superior Court by James J. Stevinson in the name of a corporation owning much land in Merced and Stanislaus Counties. The corporation complains that the value of the land will be impaired if the flow of water in the river is diminished.

The suit is similar in nature to that filed against the Southern California Edison Company in Fresno County by the Herminghaus estate in which judgment was returned against the power company. This latter case has been appealed to the higher courts. (Journal of Electricity, June 15, 1925, p. 600.)

Many Prominent Eastern Manufacturers Attend N. E. L. A. Convention

Conspicuous among the delegates in attendance at the National Electric Light Association convention held in San Francisco June 15-19, were many prominent Eastern and Middle Western manufacturers. That so many gave the time and incurred the expense necessary to make the trip to the Pacific Coast is evidence of the interest being taken by Eastern business men in the expansion of Western business and an acknowledgment of the active part being played by the West in the progress of the industry. Among the representatives of manufacturing concerns registered were the following:

Banet, R. J.	Utensils Co.	Fort Wayne, Ind.
Bole, Allen	National Pole Co.	Escanaba, Mich.
Brown, A. A.	Westinghouse El. & Mfg. Co.	New York City
Brown, George N.	Pittsburgh Transformer Co.	Pittsburgh, Pa.
Campbell, Reginald M.	Sangamo Electric Co.	New York City
Cleary, James	Combustion Eng'g. Corp.	Detroit, Mich.
Conrad, N. J.	Schweitzer & Conrad, Inc.	Chicago, Ill.
Curtis, Augustus D.	Natl. Lamp Wks. of G.E. Co.	Cleveland, Ohio
Doane, S. E.	Natl. Lamp Wks. of G.E. Co.	Cleveland, Ohio
Dowd, H. Charles	Ray D. Lillibridge, Inc.	New York City
Duersten, W. E.	American Resistor Co.	Milwaukee, Wis.
Dwelley, G. M.	Kelvinator Corp.	Detroit, Mich.
Eckert, G. E.	R. Thomas & Sons Co.	Detroit, Mich.
Flory, A. C.	Allis-Chalmers Mfg. Co.	Milwaukee, Wis.
Freeman, G. A.	Walker Vehicle Co.	Chicago, Ill.
Gallagher, W. N.	Automatic Elec. Washer Co.	Newton, Iowa
Gauntlett, Gordon C.	Safety Insurance Wire Co.	New York City
Glodschmidt, E. W.	Wagner Electric Corp.	New York City
Goodrich, E. L.	Wheeler Condenser & Eng. Co.	Carteret, N. J.
Gray, C. B.	Natl. Lamp Works of G.E. Co.	Cleveland, Ohio
Griggs, H. L.	The Bristol Co.	Waterbury, Conn.
Greene, J. J.	Johns-Manville, Inc.	New York City
Harvey, Irwin J.	Aluminum Co. of America	Pittsburgh, Pa.
Hawley, Kent A.	Locke Insulator Corp.	Victor, N. Y.
Herr, E. M.	Westinghouse El. & Mfg. Co.	New York City
Hill, Charles L.	California Wire Co.	Orange, Calif.
Hoit, J. D.	Line Equipment Sales Co.	Cleveland, Ohio
Howland, L. D.	Bailey Meter Co.	Cleveland, Ohio
Hughes, George	Edison, El. Appli. Co., Inc.	Chicago, Ill.
Hurley, Edward N.	Hurley Machine Co.	Chicago, Ill.
Hurtt, C. H.	Sangamo Electric Co.	Chicago, Ill.
Jaeger, A. H.	Edison Elec. Appliance Co.	Chicago, Ill.
Jaques, C. F.	Rathbone Sard Elec. Co.	Aurora, Ill.
Johnson, J. A.	Kuhlman Electric Co.	Bay City, Mich.
Jones, E. H.	California Wire & Cable Co.	Los Angeles, Calif.
Kauffman, T. J.	Square D Co.	Detroit, Mich.
Kearney, James R.	W. N. Matthews Corp.	St. Louis, Mo.
Keating L. M.	Ohio Brass Co.	Mansfield, Ohio
Lamkey, Stanley G.	Walker Vehicle Co.	Chicago, Ill.
Lambert, M. B.	Westinghouse El. & Mfg. Co.	East Pittsburgh, Pa.
Leah, Elmer, Jr.,	The Leach Co.	Oshkosh, Wis.
Lewis, N. E.	Babcock & Wilcox Co.	New York City
Lillibridge, Ray D.	Ray D. Lillibridge, Inc.	New York City
Lindemann, A. L.	A. J. Lindemann & Hoverson	Milwaukee, Wis.
Lovejoy, J. R.	General Electric Co.	Schenectady, N. Y.
Maddox, G. F.	Delta Star Electric Co.	Chicago, Ill.
Maxwell, M. P.	The R. Thomas & Sons Co.	New York City
Merrill, G. S.	Natl. Lamp Works of G.E. Co.	Cleveland, Ohio
Moe, Henrik	Moe-Bridges Co.	Milwaukee, Wis.
McIlvane, W. J.	W. N. Matthews Corp.	St. Louis, Mo.
McIver, J. W.	Edison Lp. Wks. of G. E. Co.	Harrison, N. J.
McManis, Thomas J.	General Electric Co.	Schenectady, N. Y.
Naugle, J. B.	Naugle Pole & Tie Co.	Chicago, Ill.
Nelson, H. E.	Automatic Elec. Washer Co.	Newton, Iowa
Nelson, George	Wagner Electric Corp.	Chicago, Ill.
Noyes, Ernest H.	Aluminum Co. of America	Chicago, Ill.
Ogg, H. L.	Automatic Elec. Washer Co.	Newton, Iowa
Osborn, M. C.	Landers, Frary & Clark	New Britain, Conn.
Page, A. D.	General Electric Co.	Harrison, N. J.
Pace, T. J.	Westinghouse El. & Mfg. Co.	East Pittsburgh, Pa.
Pfau, Arnold	Allis-Chalmers Mfg. Co.	Milwaukee, Wis.
Presbrey, J. O.	The Miller Co.	Cleveland, Ohio
Price, R. F.	Century Electric Co.	St. Louis, Mo.
Pyle, W. F.	Duncan Electric Mfg. Co.	Lafayette, Ind.
Reagan, F. H.	Locke Insulator Corp.	Baltimore, Md.
Richards, T. T.	Wagner Electric Corp.	St. Louis, Mo.
Rucker, Geo.	Holophane Glass Co.	New York City
Rudd, H. H.	Ry. & Industrial Eng. Co.	Greensburgh, Pa.
Schwartz, Michael	The Miller Co.	Meriden, Conn.
Scott, Roscoe E.	Natl. Lamp Works of G.E. Co.	Cleveland, Ohio
Searle, C. E.	Allis-Chalmers Mfg. Co.	Milwaukee, Wis.
Seaver, Harry G.	The Servel Corp.	New York City
Shute, Henry D.	Westinghouse El. & Mfg. Co.	East Pittsburgh, Pa.
Sniffin, E. H.	Westinghouse El. & Mfg. Co.	East Pittsburgh, Pa.
Steinmetz, Jas. A.	American Resistor Co.	Philadelphia, Pa.
Stringfellow, G. E.	Edison Storage Battery Co.	West Orange, N. J.
Swayze, F. H.	Western Electric Co.	New York City
Swope, Gerard	General Electric Co.	Schenectady, N. Y.
Taylor, H. Birchard	Wm. Cramp & Sons	Philadelphia, Pa.
Terry, F. S.	Natl. Lamp Works of G.E. Co.	Cleveland, Ohio
Thomson, P. L.	Western Electric Co.	New York City
Tripp, Guy E.	Westinghouse El. & Mfg. Co.	New York City
Veach, J. S.	Ohio Brass Co.	Mansfield, Ohio
Watkins, J. W.	Ohio Brass Co.	Mansfield, Ohio
Wemple, J. Herbert	Edison Lmp. Wks. of G. E. Co.	Harrison, N. J.
Wescott, E. C.	The Okonite Co.	Passaic, N. J.
White, E. Cantello	Tork Company	New York City
Wilson, R. B.	El. Vacuum Cleaner Co., Inc.	Cleveland, Ohio
Zimmerman, P. B.	Natl. Lamp Works of G.E. Co.	Cleveland, Ohio

Pacific Coast Electrical Association

William Baurhyte Is Elected P.C.E.A. President at Annual Meeting

The election of William Baurhyte, Los Angeles Gas and Electric Corporation, as president, along with a long slate of officers for the coming year, brief reports from Frank A. Leach, Jr., Pacific Gas and Electric Company, retiring president of the Association, J. F. Pollard, Coast Valleys Gas & Electric Company, treasurer, and S. H. Taylor, secretary, were the principal features of the annual meeting of the Association held at the Exposition Auditorium, San Francisco, June 15. The meeting was held prior to the annual convention of the National Electric Light Association, and was addressed by Franklin T. Griffith, president, and M. H. Aylesworth, managing director of the national organization.

WILLIAM BAURHYTE

Due to the small amount of time available for the annual meeting of the Association, the reading of the president's and secretary's reports was dispensed with, and these will be published in the July 15 issue of the Journal of Electricity.

In commenting on the work that the Association had done during his administration, President Leach stated that the reports of the sections of the Association as they had been published would be considered the reports of chairmen. He complimented the entire membership of the Association on the cooperation that had been shown and upon the excellence of the work that had been done during the year.

The report of the nominating committee as read by Lee M. Newbert, Pacific Gas and Electric Company, chairman, was adopted unanimously by the Association members and the secretary was directed to cast an unanimous ballot for the election of the following:

President, William Baurhyte, Los Angeles Gas and Electric Corporation.

First vice-president, S. Waldo Coleman, Coast Counties Gas & Electric Company.

Second vice-president, W. L. Frost, Southern California Edison Company.

Treasurer, J. F. Pollard, Coast Valleys Gas & Electric Company.

Executive committee: F. A. Leach, Jr., Pacific Gas and Electric Company; F. E. Boyd, General Electric Company; F. H. Woodward, Great Western Power Company; A. E. Holloway, San Diego Consolidated Gas & Electric Company; F. O. Dolson, The Southern Sierras Power Company; A. M. Frost, San Joaquin Light & Power Corporation; D. E. Harris, Pacific States Electric Company; J. C. Rendler, J. C. Rendler, Inc.; C. T. Hutchinson, Journal of Electricity; C. E. Heise, Westinghouse Electric & Manufacturing Company; P. M. Downing, Pacific Gas and Electric Company; and A. B. Day, Los Angeles Gas and Electric Corporation.

Following the election, the newly elected officers, with the exception of W. L. Frost, were escorted to the platform and at the suggestion of Mr. Leach, president of the Association, each of the gentlemen addressed the meeting. Mr. Baurhyte, in acknowledging the honor bestowed upon him, stated that he hoped that the excellent cooperation of the entire membership of the Association would be given him as had been given President Leach. The newly elected president complimented the reports of the sections as they had been presented in the Journal of Electricity, and expressed hopes that next year's work would be as productive.

Mr. Coleman assured the Association that he would give his support to Mr. Baurhyte during the coming year and expressed the hope that despite the fact that the past year has been the best the Association has known, that next year's work would be even better.

In addressing the Pacific Coast Association as managing director of the N.E.L.A., M. H. Aylesworth stated that one of the reasons that San Francisco, and particularly the Pacific Coast, had been chosen for the 48th convention of the N.E.L.A., was that this section of the United States had taken the lead in three of the most important subjects that would be discussed during the convention. These three subjects are: first—the interconnection of electric utility systems, permitting the exchanging of large blocks of power over a wide territory; second—the customer-ownership of utility companies; and, third—the electrification of agriculture.

Meeting Is Held by Technical Executive Committee

Matters dealing with the past year's work and plans for that to be done during the coming year were discussed at a meeting of the executive committee of the Technical Section, P.C.E.A., held at the Palace Hotel, San Francisco, on the morning of June 15.

The matter of discussion of the many papers submitted covering the work of the Technical Section of the Association was the first to be brought to the attention of the members of the executive committee by P. O. Crawford, the retiring chairman. The fact that all of these papers were presented solely through the columns of the Journal of Electricity instead of orally, as is the usual custom, makes the adequate discussion of these papers somewhat more of a problem than is usually the case. Inasmuch as full discussion of these papers is necessary if they are to be of full value and use, it was urged that each committee (formerly bureau) chairman make special effort to obtain the submission of such discussion for subsequent publication. It was suggested that each chairman should assume the responsibility of approaching those within his circle of acquaintance who would qualify for this purpose.

An outline of a report to cover the activities of the Technical Section for the past year was checked over by Mr. Crawford and the assembled committee chairmen to assure its completeness and correctness. Following this, and an expression of gratitude from Mr. Crawford for the splendid cooperation of the various members of the executive committee of the section, the meeting was turned over to R. R. Cowles, Pacific Gas and Electric Company, vice-chairman.

Meetings as definitely settled upon for the coming year for the Technical Section are as follows:

General and executive committee meeting in September, to be held in Los Angeles; in January, 1926, to be held in San Francisco; in March, 1926, to be held in Fresno.

When the N.E.L.A. delegates on the Orarge Special arrived in Spokane, they were taken to the Long Lake plant of The Washington Water Power Company in automobiles furnished by that company, the Western Red Cedar Association and the electrical fraternity of the city. Near the plant the eastern visitors were greeted by two families of Indians, who gave Indian names to four of the Chicago members of the party—Martin J. Insull, Middle West Utilities Company; Marshall E. Sampsell, Central Illinois Public Service Company; B. J. Mullaney, Commonwealth Edison Company, and George N. Nelson, Wagner Electric Corporation. Mr. Nelson and Mr. Sampsell are shown decorated by their newly acquired Indian friends

Meetings

Northwest Association Elects Officers for 1925-26

Lewis A. Lewis, sales manager, The Washington Water Power Company, was elected president of the Northwest Electric Light and Power Association at the annual meeting of the organization held in Portland, June 12. The meeting was brief, lasting but one hour after R. M. Boykin, manager central district, Puget Sound Power & Light Company, president, called the meeting to order.

Reports were read by W. A. White, Puget Sound Power & Light Company, secretary and treasurer; A. S. Moody, General Electric Company, chairman membership committee; W. H. Ude, The Washington Water Power Company,

LEWIS A. LEWIS

chairman Public Relations Section; F. H. Martin, chairman credentials committee. The report of A. N. Cudworth, Northwestern Electric Company, chairman of the Accounting Section, was not presented as it had been printed in booklet form. J. F. Orr, Idaho Power Company, chairman Commercial Section, was unable to be present, and W. A. White announced that the section's report had been printed.

H. H. Schoolfield, Pacific Power & Light Company, chairman of the Technical Section, reporting for that subdivision, announced the progress made in line with eliminating difficulties for radio users and reported on an attempt to institute legislation prohibiting farmers from moving hay derricks under high-tension lines. The meeting voted to place this last matter in the hands of the Public Relations Section.

The constitutional amendment committee, headed by George L. Myers, Pacific Power & Light Company, reported that it favored a change in the method of assessing dues of member companies from the present one of determining the dues on population to one based on a percentage of gross revenue. Under the plan suggested the companies are to be assessed 0.00017 per cent of their gross annual revenue. The plan was adopted as presented by the committee. Several other minor changes were adopted as submitted in a written report.

The report of the nominating committee, naming the following men for the coming year was presented and unanimously adopted:

President—Lewis A. Lewis, The Washington Water Power Company.

Vice-president for Idaho—R. B. King, Idaho Power Company.

Vice-president for Utah—D. C. Green, Utah Power & Light Company.

Vice-president for Oregon—George L. Myers, Pacific Power & Light Company.

Vice-president for Washington—N. W. Brockett, Puget Sound Power & Light Company.

Vice-president for Montana—A. T. Schultz, Helena Light & Railway Co.

Members-at-large of executive committee—A. C. McMiken, Portland Electric Power Company; J. Caldwell, Western Electric Company.

During the meeting N. W. Brockett was elected an honorary member of the Association. No action was taken on the transfer of the British Columbia Electric Railway Company, Ltd., from membership in the Canadian Electrical Association, the Canadian division of the N.E.L.A., to the Northwest Electric Light and Power Association. Definite action was deferred pending action by the N. E. L. A., as it was considered that a constitutional amendment was necessary.

Boulder Dam Association Holds Meeting at Ontario

More than two hundred representatives of civic and community organizations of California, Arizona and Nevada came together at the annual meeting of the Boulder Dam Association at Ontario, Calif., on June 13. This organization has as its object the putting through of the Swing-Johnson Bill, which provides for the construction by the federal government of a high dam at Boulder Canyon on the Colorado River.

John L. Bacon, mayor of San Diego, president of the association, introduced Arthur P. Davis, former head of the United States Reclamation Service who, as the principal speaker, advocated immediate construction of this dam. Mr. Davis stressed the fact that it was necessary to construct this dam on the Boulder Canyon site not only for water and power but also as a flood-protection measure to the Imperial Valley. Great satisfaction was expressed by the delegates at the heavy vote polled at the recent election in Los Angeles in favor of the $2,000,000 bond issue for preliminary investigations of the Colorado River.

News of the Electragists

Plans Completed for Divisional Electragists' Convention

Plans have been completed which assure the success of the divisional convention of the California Electragists which will be held at the Eureka Inn, Eureka, Aug. 6-8.

The program as outlined at present is as follows:

Thursday, Aug. 6, 9:00 a.m.—Executive committee meeting. 2:00 p.m.—General open meeting. 2:00 p.m.—Auto tour up the coast for ladies.

Friday, Aug. 7, 8:00 a.m.—Leave for day in logging woods, including trip to electric mills. 1:30 p.m.—Lumberjacks' dinner served in camp cookhouse. 9:00 p.m.—Ball (informal).

Saturday, Aug. 8, 6:00 a.m.—Golf. 10:00 a.m.—Baseball (Contractors vs. Jobbers). 1:30 p.m.—Special feast prepared by Eureka boys in beautiful Sequoia Park. 6:30 p.m.—Banquet 8:30 p.m.—Dancing.

The Humboldt County Electragists have a few unannounced suprises in store for those attending. The registration fee is $5 per person, which includes admittance to the ball, banquet and sightseeing trips.

Reservations

In discussing the subject of reservations Victor Lemoge, president of the association, said: "All hotel reservations must be made through the San Francisco office of the California Electragists at 522 Call Building, **and must be accompanied with registration fee.** It is suggested that this be done at once. Those making reservations are requested to keep in mind the fact that in order to house everyone at the Inn, it will be necessary to put two, and in some cases three, in a room. Also kindly **state the exact date of your arrival in Eureka. Will you be accompanied by your wife? If not, please state preference for fellow room mate.** No reservations will be accepted by the hotel, and should any have been forwarded to them at the present date, they will be canceled. The hotel people expect the organization to guarantee the reservations and this is the reason for the above."

Rates at the Eureka Inn are as follows:

European Plan

Double room with bath (for two)	$5.00
Double room without bath (for two)	3.50
Double room, twin beds (for two), with bath	5.50
Double room, twin beds without bath (for two)	4.00
Double and single with bath (for three)	6.50

A number of delegates are planning to motor over the famous Redwood Highway which leads from Sausalito on San Francisco Bay to Eureka, a distance of 290 miles. It may be traveled in 12 to 16 hours and offers the motorist a splendid picture of northwestern California.

The Northwestern Pacific schedules are:

Leave San Francisco Ferry Building	Arrive in Eureka
8:15 p.m.	8:00 a.m.
7:45 a.m.	7:30 p.m.
Leave Eureka	**Arrive in San Francisco**
8:00 p.m.	9:05 a.m.
8:00 a.m.	7:35 p.m.
Ninety-day round trip tickets	$19.20
Upper Berth	3.00
Lower Berth	3.75

By stage to Eureka, West Coast Transit Company, 75 Fifth Street, San Francisco:

Leave San Francisco Daily	Arrive in Eureka
6:45 a.m.	8:20 p.m.
Leave Eureka	**Arrive in San Francisco**
6:30 a.m.	8:05 p.m.
Fare one way	$11.90
Round trip	18.00

Special arrangements have been made for the entertainment of the ladies and children.

Personals

C. M. Brewer, vice-president and general manager of the Mountain States Power Company, Albany, Ore., has been elected a member of the board of directors of the Standard Gas

C. M. BREWER

& Electric Company, Chicago, the parent company of the Mountain States Power Company, which is managed and operated by the Byllesby Engineering & Management Corporation. Mr. Brewer was born in Marshall, Mich., and received his education at the University of Michigan, graduating in 1904. In 1909 he joined the Byllesby organization at Muskogee, Okla., and the following year was transferred to Mankato, Minn. At about this time the Byllesby company entered the Northwest territory, and soon Mr. Brewer was transferred to Everett, Wash. After a short time there he was appointed manager of the Sandpoint, Idaho, division of the Mountain States Power Company, remaining there until 1912 when he was sent to manage the Byllesby company holdings in Richmond, Calif. In 1919 he was appointed to his present position. His election to the board of directors of the Standard Gas & Electric Company represents a recognition of satisfactory managerial service, and is intended to enlarge his scope of usefulness to his company.

R. D. Wichman, formerly electrical and civil engineer with the Pacific Gas and Electric Company, San Francisco, for the past three and a half years in charge of design of transmission substations, distribution substations, steam generating stations and steam heating plants, now is associated with **Wichman & Albers,** Engineers Service Bureau, 525 Market Street, San Francisco.

W. H. Frisby, electrical engineer and contractor of Provo, Utah, has been awarded the contract for the installation of that city's new whiteway lighting system. Work on the new system will be commenced as soon as equipment can be procured.

Dwight P. Robinson, of Dwight P. Robinson & Company, Inc., New York City, was one of a number of eminent engineers who attended the forty-eighth convention of the N.E.L.A. in San Francisco.

C. B. Hawley, general manager of the Intermountain Electric Company, Salt Lake City, Utah, and president of the Rocky Mountain Electrical Cooperative League, has been making an extended business trip East. While away Mr. Hawley expects to attend several conventions, and to return home during the latter part of June.

F. M. Feiker, vice-president, The Sociey for Electrical Development, New York City, was among the prominent Eastern delegates to the N.E.L.A. convention recently held in San Francisco.

P. L. Thomson, publicity manager, Western Electric Company, Inc., New York, spoke to an interested audience at the joint meeting held by the San Francisco Advertising Club and Better Business Bureau during the week of the N.E.L.A. convention. His subject was, "Advertising as a Factor in Moulding Public Opinion." **Arthur Rowe,** of Garnett Young & Company, acted as chairman of the day.

F. H. Woodward, sales manager Great Western Power Company, of California, San Francisco, is making a trip East. He expects to visit Chicago, Cleveland and Detroit enroute.

D. L. Galusha, consulting engineer, Dwight P. Robinson & Company, Inc., New York City, was among those present at the recent N.E.L.A. convention held in San Francisco.

W. F. Wilson, formerly with Brown & Pengilly, Los Angeles, recently has become a representative of the Western Safety Manufacturing Company, with offices in San Francisco.

J. D. Hoit, sales manager, Line Equipment Sales Company, Cleveland, Ohio, who attended the N.E.L.A. convention in San Francisco, intends to spend about a month on the Pacific Coast, returning East by way of the Northwest.

Martin J. Insull, vice-president Middle West Utilities Company, Chicago, was the principal speaker at the Down Town Association meeting held during N.E.L.A. convention week in San Francisco. Mr. Insull's subject was, "Public Confidence as a Necessity in Business."

F. L. Dole, vice-president of the Aermotor Company, Chicago, was a recent visitor to the Pacific Coast, investigating local markets and reviewing the development which is taking place in the transmission fields of the West.

Alex Dow, president, Detroit Edison Company, Detroit, made an interesting speech on "Electric Service and What It Means to Community Growth" before the Union League Club luncheon meeting held in observance of "Electrical Week" in San Francisco.

Guy Tripp, chairman board of directors, Westinghouse Electric & Manufacturing Company, New York, chose as his subject, "The Future of California," in addressing the meeting of the Commercial Club, San Francisco, during "Electrical Week" observed by the clubs of the city in cooperation with the N.E.L.A. convention.

E. E. Whitehorne, commercial editor Electrical World, New York, addressed the Public Spirit Club, San Francisco, on "Electricity and the Public Spirit," during N.E.L.A. convention week.

Elmer Leach, Jr., of the Leach Company, Oshkosh, Wis., recently was on the Pacific Coast attending the N.E.L.A. convention and investigating the company's distribution problem at the same time.

F. G. Hamilton, until recently general superintendent of distribution, Southern California Edison Company, Los Angeles, has been appointed assistant manager of operation for that company. He succeeds R. E. Cunningham, who has been made operating electrical engineer. Mr. Hamilton has a record for long service with the company and its predecessors. He started with the Mt. Whitney Power & Electric Company in 1899 as lineman. Subsequently he served as trouble-shooter, substation operator,

F. G. HAMILTON

sub-district agent, power and lighting salesman, engineer and operator on several large pumping plant installations, and then was made division superintendent in charge of construction and operation in the territory including Exeter, Lindsay and Porterville, Calif. Later he became successively superintendent of distribution, purchasing agent and general superintendent of the western division. When the Mt. Whitney company merged with the Edison company in 1917 Mr. Hamilton was appointed distribution superintendent of the San Joaquin division. Seven years later he was made general superintendent of distribution.

M. S. Sloan, president, Brooklyn Edison Company, Inc., New York, and chairman Public Relations National Section, N.E.L.A., spoke on "Public Relations of Utilities" at the Kiwanis Club meeting held during "Electrical Week" in San Francisco.

Gerard Swope, chairman, board of directors, General Electric Company, Schenectady, N. Y., was the principal speaker at the Commonwealth Club's luncheon meeting held in observance of "Electrical Week" in San Francisco. Mr. Swope, a delegate to the N.E.L.A. convention, spoke informally.

Obituary

Mrs. Florence Britton, widow of the late John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company, San Francisco, died June 23, in Redwood City, Calif.

R. C. Cole, sales manager of the electrical division, Johns-Pratt Company, Hartford, Conn., and associated with that company for the past twenty-five years, died May 10 in that city.